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ORIGINAL ARTICLES.

THE POWERFUL EFFECT OF SULFONAL IN ARRESTING THE CRAMPS OF FRACTURED LIMBS, AND REFLEX SPASMS FROM OTHER CAUSES.

Read before the Section of Surgery and Anatomy, at the Forty-third Annual Meeting of the American Medical Association, at Detroit, Mich., June, 1892.

BY EDWARD ANDREWS, M.D.,
OF CHICAGO.

Sulfonal was discovered only six years ago by E. Baumann. Chemical nomenclature has evolved for it the frightful name of diethyl sulphon-dimethyl-methan. Prof. A. Kast first reported on its qualities in *Die Berliner Klin. Wochenschrift*, in 1888, or four years ago. About three years ago my attention was turned to its remarkable power of arresting the spasms of fractured limbs by having given a dose for its supposed hypnotic effect, and finding instead a strong antispasmodic result. I published my observation not long afterwards in a short article. Since then I have continued my experiments, and now offer a condensed statement of the results.

It is curious that the numerous writers who have reported upon this new drug have almost uniformly confined their attention to its sleep producing influence, and overlooked its remarkable antispasmodic power. In fact Dr. W. F. Shick, writing in 1889 to the *Journal of Nervous Diserses* went so far as to say that the drug has no influence on motor nerves, nor on the muscles. Four or five writers, however, have caught slight glimpses of its antispasmodic power.

Forster, who is said to have administered not less than eighteen pounds of it, remarked that it is chiefly a motor depressor.

Roubinovitch in one case cut off a paroxysm of spasmodic asthma, by doses of fifteen grains.

A. S. Faulkner, of India, reported one case of chordee arrested by it.

J. M. Coates reported the greatest benefit in epilepsy, and in obstinate hiccough.

J. A. Jeffries reported five cases of chorea rapidly cured by the article.

My first observation was upon a case of painful cramps from a recently fractured femur. Morphine relieved the patient as long as he could keep awake, but as soon as he became drowsy the cramps returned. On changing to suflonal in fifteen grain doses the spasms were completely arrested both in the waking and the sleeping condition. Repetition of the treatment in other cases of fracture showed always the same result.

A gentleman in a railroad accident received a slight fracture of the spine without any compression of the cord. He was harassed whenever he fell asleep by cramps of the inter-costal muscles adjacent to the injured vertebra. Sulfonal in fifteen grain doses arrested the trouble completely.

I may remark here that the drug is slow in its action, and where the cramps are only nocturnal, it is necessary to give either a large dose two or three hours before the sleeping time, or else to keep up the effect by using moderate doses three times a day.

I found one physician using this medicine to arrest the spasms of ejaculatory muscles which cause nocturnal emissions of semen. He gave six grains three times a day, and claimed excellent results. At his suggestion I tried it with good success, increasing the dose however, to eight grains.

From analogy I think the remedy will act well in cases of premature ejaculation in copulation, but I have not yet tried it for that purpose.

I have used sulfonal to arrest two cases of obstinate hiccough.

A gentleman was troubled for many years with nocturnal cramps of the legs and thighs, increasing slowly as his years advanced. Fifteen grains of sulfonal taken before retiring always prevented the spasms. After two months he found that a single dose would prevent the trouble for nearly a week. In about ten weeks more the course of the trouble seemed to be cured, so that he has now been a long time without requiring or taking any of the remedy.

A vigorous young man engaged in superintending the construction of a building, fell 32 feet, striking obliquely on a slope of timber, causing a severe contusion of the right sciatic nerve, without fracturing any bone. The thigh and leg of the injured side kept up a constant and painful jerking motion, resembling somewhat the movements in chorea. Two doses of sulfonal of fifteen grains each completely arrested the distressing movements.

It seems that the antispasmodic power of sulfonal is of more value than its sleep producing influence, and that it will prove of immense value in many cases in which no one has yet thought of giving it a trial.

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Dr. Brooks, of Iowa, stated that he had sustained a fall, resulting in a severe synovitis, which caused sudden spasmodic contraction of the leg during sleep. Sulfonal was prescribed and the spasms relieved from the first.

Dr. Murphy reported the case of a pregnant woman who suffered much at night from cramping in the legs. He prescribed sulfonal and found that one dose was usually sufficient to give relief. He has used the drug in two other cases with excellent results.

Dr. James A. Work, of Indiana, has a patient to whom he has been giving sulfonal for rheumatism, attended with cramps of the legs at night. The remedy acted admirably, but he had often been asked if there was not danger of a habit being formed. It was a relief to know that as the case progresses less of the drug is administered.

Dr. J. I. Strippmatre, of Philadelphia, stated that he had found the drug useful in the low nervous form of typhoid

fever, accompanied with jactitations. He related a case in which there had been no sleep for six days. Twenty grains of sulfonal were given and the patient slept for twenty-four hours, only being aroused to take food. Recovery was thenceforth uninterrupted.

SECTION OF OPHTHALMOLOGY.

RECORD OF THE MINUTES.

The sessions of this Section were held in the morning and afternoon of June 7, 8, 9, and 10, 1892, in the club room of the Hotel Cadillac, Detroit, Mich.

TUESDAY JUNE 7.—AFTERNOON SESSION.

Dr. J. L. Thompson in the chair. Meeting called to order at 3:30 P.M. The Chairman opened the meeting with an address entitled "How Shall We Make the Meetings of Our Section More Attractive and Helpful?"

After the reading of the paper the reports of committees was the next order of business. No report having been received, the reading and discussion of the papers followed.

The first paper, entitled "Gradation of Lenses," was read by Dr. Dudley S. Reynolds, of Louisville, Ky. Dr. Leartus Connor moved that all gentlemen interested in the subject of ophthalmology then present in the room be invited to participate in the discussion of the papers. Carried.

The second paper, entitled "Some Peculiar Cases of Astigmatism," was by Dr. W. Cheatham, of Louisville, Ky. The author of this paper was absent.

The third paper, entitled "What May be Considered Normal Corneal Astigmatism, With Results from Keratometric Examination of One Hundred Emmetropic and One Hundred Ametropic Pairs of Eyes," was read by Dr H. V. Würdemann, of Milwaukee Wis. The paper was discussed by Drs. H. D. Noyes, S. D. Risley, G. C. Savage, Eugene Smith and A. A. Hubbell, and the discussion closed by the author.

The fourth paper, entitled "A Study of the Eyes of Three Hundred and Fifty-seven Boys in the Penn Charter School, of Philadelphia, with Notes on the Examination of School Children," was read by Dr. B. Alex. Randall. It was discussed by Drs.Risley and Dowling and the discussion closed by the author.

The fifth paper, entitled "Latent Hyperopia," was read by Dr. Edward Jackson, of Philadelphia, Pa. It was discussed by Drs. C. H. Thomas, H. V. Würdemann, J. A. Lydston, F. C. Hotz and B. Alex. Randall, and the discussion closed by the author of the paper.

The sixth paper, entitled "The Fourth Degree Prism in the Correction of Hyperphoria," was read by Dr. A. E. Prince, of Springfield, Ill., and was discussed by Drs. Gradle and Risley, the discussion being closed by the author.

The seventh paper, entitled "On the Relation of the Motor Muscles of the Eyes to Certain Facial Expressions," was read by Dr. George T. Stevens, of New York. Three other papers appeared on the list, the authors of which were absent.

The Chairman then announced the Nominating Committee, as follows: Dr. F. C. Hotz, Dr. J. J. Chisolm, and Dr. Leartus Connor.

Dr. S. C. Ayres made a statement from the Executive Committee concerning the registration fee of one dollar, and to what this amount of payment would entitle each member, stating that he would introduce a resolution covering the ground. Dr. Ayres's remarks were discussed by Dr. Eugene Smith. On motion the meeting adjourned.

WEDNESDAY, JUNE 8.—MORNING SESSION.

Dr. J. L. Thompson in the chair. Meeting called to order at 9 A.M. The minutes of the previous meeting were read and adopted.

The first paper, entitled "Immature Cataract and the Best Method for Hastening Maturity," was read by Dr. J. A. White of Richmond, Va. The paper was discussed by Drs. Chisolm, Minney, Hotz, Tilley, Baker, Prince and Frothingham, and the discussion closed by the author.

It was then moved and carried that the discussion of the papers concerning cataract be postponed until all of them had been read.

The second paper, entitled "Treatment of Incipient Cataract," was read by Dr. A. J. Erwin, of Mansfield, Ohio.

The third paper, entitled "Method and Results of Simple Extraction," was read by Dr. H. Knapp, of New York. These papers were discussed by Drs. Chisolm, Fox, Frothingham, Noyes, Smith, Scott, Minney, Randall and Risley, and the discussion was closed by Drs. Erwin and Knapp. On motion the meeting adjourned.

WEDNESDAY, JUNE 8.—AFTERNOON SESSION.

Dr. J. L. Thompson in the chair. Meeting called to order at 3 P.M.

The first paper, entitled "New Operation for Trichiasis and Distichiasis—Galvano-Cautery," was read by Dr. Eugene Smith, of Detroit, Mich. The author of the paper also exhibited a patient on whom this operation had been performed. The paper was discussed by Drs. Hotz and Savage, and the discussion closed by the author.

According to the by-laws, the Committee on Nominations, consisting of Drs. F. C. Hotz, J. J. Chisolm and Leartus Connor, reported the following officers for the ensuing year: Dr. S. D. Risley, of Philadelphia, Chairman. Dr. Henry Gradle, of Chicago, Ill., Secretary. On motion the Secretary was directed to cast the ballot of the Society for these nominations. He accordingly carried out the instruction of the Society in this request. Drs. Risley and Gradle then accepted the offices to which they had been nominated in brief speeches.

Dr. S. C. Ayres on behalf of the Executive Committee then presented the following resolution which was adopted:

"The Executive Committee recommend that a registration fee of one dollar be assessed each year on every active member. In consideration of this fee, the member will receive one bound copy of the Transactions for the current year."

The second paper entitled "The Pathology and Treatment of Infantile Cataract," was read by Dr. A. R. Baker, of Cleveland, Ohio. The paper was discussed by Dr. Randall, and the discussion closed by the author.

The third paper, entitled "A Case of Congenital Ectopia Lentis," was read by Dr. George Friebis, of Philadelphia. The paper was discussed by Drs. Bryant, Randall, Morrow and Smith, and the discussion closed by the author.

The fourth paper, entitled "Injuries to the Lens with Cases," was read by Dr. B. L. Millikin, of Cleveland, Ohio. The paper was discussed by Drs. Ayres, Jackson, Aschman, Smith and Lippincott, and the discussion closed by the author.

The Secretary then announced that Dr. Charles A. Oliver, of Philadelphia, was unavoidably detained, but had sent an abstract of his paper. On motion the Secretary was directed to read the abstract, the title of the paper being "Clinical History of a Case of Successful Extraction of a Piece of Steel from an Iris and Lens by an Iridectomy, With Subsequent Absorption of the Lens Substance and Recovery of Normal Vision." It was moved that the paper be transmitted to the Executive Committee with power to act on its admission to the Transactions. The Secretary then announced that Dr. T. E. Murrell, of Little Rock, Ark., was unavoidably absent, but had sent his paper and an abstract of it. It was moved and adopted that the abstract be read. The Secretary then read an abstract of a paper, entitled "Eye Injuries Considered in Relation to Sympathetic Affections," by Dr.T. E. Murrell, of Little Rock,Ark. It was moved and adopted that the paper be referred to the Executive Committee with power to act. These motions were made after Dr. Hotz had pointed out the necessity of not admitting to the Transactions any paper unless the author were present himself, or had at least sent with his paper a full abstract of the same which should be read to the Society. Similar remarks were made by Drs. Ayres and Smith.

The fifth paper, entitled "The Advantages of Optico-Ciliary Neurotomy Over Enucleation," was read by Dr. J. J. Chisolm, of Baltimore, Md. It was discussed by Drs. Smith, Risley, Hotz and Ayres, and the discussion closed by the author.

The sixth paper, entitled "Surgical Treatment of Trachoma," was read by Dr. J. E. Weeks, of New York. The paper was discussed by Drs. Würdemann, Hotz and Knapp, and the discussion closed by the author. On motion the meeting adjourned.

THURSDAY, JUNE 9.—MORNING SESSION.

Dr. J. L. Thompson in the chair. Meeting called to order at 9 A.M. The minutes of the previous meeting were read and approved.

The first paper, entitled "Thiersch's Skin Grafts in Ophthalmic Surgery," was read by Dr. F. C. Hotz, of Chicago, Ill. Dr. Hotz first stated that he desired to change the title of his paper to "Thiersch's Skin Grafts in the Treatment of Pterygium." The paper was discussed by Drs. Prince, Savage, Starkey, Baker, Minney and Noyes, and the discussion

closed by the author. Dr. S. C. Ayres moved that papers sent in by title, but not represented by their authors or by abstracts, should be excluded from the Transactions. Carried.

The Secretary announced that Dr. C. J. Lundy, whose name appeared in the list of the first afternoon session, had died; that his paper was, however, prepared and at the disposal of the Society, the paper being in the possession of the deceased member's family. Dr. G. C. Savage moved that a committee be appointed by the Chair who should draw up a resolution expressive of the Society's sorrow at the death of its fellow member. The Chair appointed on this committee Drs. G. C. Savage and Leartus Connor. The Committee has forwarded the following minute:

WHEREAS, The Ophthalmological Section of the American Medical Association, at its meeting in Detroit, June, 1892, learns of the death of one of its members, Dr. J. C. Lundy, therefore be it

Resolved, That as a Section we mourn the loss of an indefatigable worker in ophthalmology, and of an esteemed contributor to the prosperity of the Section.

Resolved, That we deplore his loss to his family, the medical profession, and his large circle of friends.

Resolved, That we tender to the family of our deceased brother our heartfelt sympathy.

Resolved, That a copy of these resolutions be sent to the family of the deceased.

G. C. SAVAGE, Nashville, Tenn.
LEARTUS CONNOR, Detroit, Mich.
Committee.

The second paper, entitled "Osteoma of the Orbit; Removal With Preservation of the Visual Functions," was read by Dr. Edward Jackson, of Philadelphia. The third paper, entitled "Orbital and Ocular Growths with the Report of Three Cases," was announced as conjointly the work of Drs. J. A. White, of Richmond, Va., and William M. Gray, of Washington, D. C., and was read by Dr. J. A. White. The fourth paper, entitled "A Case of Rare Form or Orbital Tumor," was read by Dr. George E. Frothingham, of Detroit, Mich. It was moved and carried that all of the papers referring to orbital disease should be discussed together. The papers were discussed by Drs. Knapp, Reeves, Chisolm, Ayers and Johnson. The discussion was closed by Drs. Frothingham and White.

The Secretary announced that Dr. J. G. Carpenter, of Stanford, Ky., who was listed for a paper entitled "Tumor of the Cornea," was absent, but had sent his paper and an abstract of it. It was moved and carried that Dr. Carpenter's paper be referred to the Executive Committee with power to act.

The fifth paper, entitled "Treatment of Keratoconus by Means of the Galvano-Cautery and Iridectomy," was read by Dr. Robert D. Gibson, of Youngstown, Ohio. The paper was discussed by Drs. Noyes, Knapp, Jackson, Chisolm and Savage, and the discussion was closed by its author. On motion the meeting adjourned.

THURSDAY, JUNE 9.—AFTERNOON SESSION.

Dr. J. L. Thompson in the Chair. Meeting called to order at 2:30 P.M.

The first paper, entitled "The Etiological Relation of Nasal Anomalies to Diseases of the Eye," was read by Dr. H. Gradle, of Chicago, Ill. It was moved and carried that all papers relating to nasal and lachrymal disease be discussed at the same time. The second paper, entitled "An Operation for Stricture of the Lachrymal Duct," was read by Dr. Charles Hermon Thomas, Philadelphia.

At this point Dr. J. L. Thompson, the Chairman, announced that owing to a notification of serious illness in the family, he would be obliged to ask to be excused from further attendance. Dr. G. C. Savage moved that a vote of consolation be extended to Dr. J. L. Thompson, and also a vote of thanks for his efficient services as Chairman of the Section. This resolution was unanimously adopted. On motion, Dr. S. D. Risley, of Philadelphia, was requested to take the chair.

The third paper, entitled "Heterophoria as a Cause of Rhinitis and Tinnitus Aurium," was read by Dr. Leartus Connor, of Detroit, Mich. On motion the meeting adjourned, to meet at 9 o'clock on the following morning.

FRIDAY, JUNE 10.—MORNING SESSION.

Dr. S. D. Risley in the chair. Meeting called to order at 9 A.M.

Dr. C. H. Thomas rose to inquire whether it was in order for a member of the American Medical Association to be registered in two Sections at one time. In reply Dr. Johnson stated such procedure was perfectly proper.

The minutes of the previous meeting, after two corrections were, adopted.

The first paper, entitled "Conservatism in the Treatment of Diseases of the Lachrymal Passages," was read by Dr. S. D. Risley, of Philadelphia, Dr. Edward Jackson occupying the chair in the mean time.

The second paper, entitled "Treatment of Epiphora," was withdrawn by its author, Dr. H. M. Starkey, of Chicago, Ill., who asked to be excused from presenting it owing to his inability to fully prepare his manuscript on account of ill health. It was moved that his excuse be accepted. Carried.

The third paper, entitled "Closure of the Lachrymal Puncta in Dacryocystitis as a Barrier Against Infection of the Wounded Eyeball," was read by Dr. G. A. Aschman, of Wheeling, West Va.

It was moved that Dr. Gould's paper, inasmuch as it pertained to the subject under discussion, be read in connection with the papers on lachrymal disease; hence the fourth paper, entitled "A Method of Infection, Treatment and Prophylaxis of Purulent Conjunctivitis," was read by Dr. G. M. Gould, of Philadelphia.

This series of papers was discussed by Drs. Gradle, Starkey, Gould, Tilley, de Schweinitz and Connor, and the discussion was closed by Drs. Thomas, Risley, Aschman and Gould.

It was announced that Drs. Thomas H. Fenton and H. Earnest Goodman, of Philadelphia, were unavoidably absent and could not present the papers for which they were listed.

The fifth paper, entitled "Insufficiences of the Oblique Muscles and How to Treat Them," was read by Dr. G. C. Savage, of Nashville, Tenn., he having substituted this paper in place of the one for which he was listed by consent. The paper was discussed by Drs. Gradle, Thomas and Connor and the discussion closed by the author.

The sixth paper, entitled "Monocular Diplopia," was read by Dr. R. Tilley, of Chicago, Ill.

The Secretary announced that Dr. Oliver Moore, of New York, was absent, but had sent his paper and an abstract of it. It was moved that the paper be referred to the Executive Committee with power to act.

On motion of Dr. Jackson it was resolved to complete the work of the Section during the morning session, and to dispense with the afternoon work. Accordingly the first paper was called, and the Secretary announced that its author, Dr. Fulton, was absent.

The seventh paper, entitled "Embolism of the Central Artery and Thrombosis, with the Report of an interesting Case," was read by Dr. S. C. Ayres, of Cincinnati, Ohio. The eighth paper, entitled "Embolism of the Central Artery of the Retina, with the Report of Three Cases," was read by Dr. G. E. deSchweinitz, of Philadelphia. These papers were discussed by Drs. Jackson and Ayres.

The ninth paper, entitled "Report of a Case of Zonular Atrophy of the Choroid," was read by Dr. Tilley, of Chicago, Ill.

The Secretary announced that the authors of the remaining papers on the list were absent, and that no abstracts had been sent.

It was then announced that Dr. J. L. Thompson had sent a letter containing his thanks for the expressions of sympathy which he had received from the Section.

It was moved that a vote of thanks be extended to the retiring Chairman and Secretary. This motion was unanimously adopted. On motion the meeting was adjourned.

The Executive Committee of the Section of Ophthalmology for the ensuing year, according to the resolution adopted at the meeting in Washington, will consist of Dr. S. C. Ayres, 64 West 7th St., Cincinnati, Ohio, Dr. F. C. Hotz, 36 Washington St., Chicago, and Dr. J. L. Thompson, 20 West Ohio St., Indianapolis. Ind., Dr. Thompson taking the place of Dr. Edward Jackson, whose term expires.

DR. J. L. THOMPSON, *Chairman.*
DR. G. E. DE SCHWEINITZ, *Secretary.*

HOW SHALL WE MAKE THE MEETINGS OF OUR SECTION MORE ATTRACTIVE AND HELPFUL?

Read in the Section of Ophthalmology, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY J. L. THOMPSON, M.D.,
PRESIDENT OF THE SECTION, OF INDIANAPOLIS, IND.

In view of the many subjects of interest contained in our present programme, it would seem that a departure from our former custom is needed.

I shall therefore, instead of reading an address on

the "Progress of Ophthalmology" (a subject with which you are all familar) simply mention to you what I believe to be the most attractive feature of our sessions, namely: the discussion which follows the reading of papers. Dispense with this, or devote too short a time to it and our meetings are unprofitable. Cultivate and foster it, then the converse obtains.

Of course,it is highly essential, that we have a sufficient number of ably written papers for our consideration, but if too many are read, the object of our meeting together is defeated and we go hence almost as barren of results as if we had remained away. It is on this rock that the chairman and secretary are liable to founder; because in their efforts to provide material, they usually have to invite many to contribute; could they know before hand just who would respond favorably, but few mistakes could happen, but dealing with unknown numbers they are just as likely to have too many as too few, when disaster follows.

Would it not be wise to give the matter over to the executive committee, whose duty it should be to decide as to the papers which should be read before the Section, and those by title only?

Subjects are often presented which have cost their authors months of painstaking research and yet, though they be the most ably prepared, if no discussion follows, they might as well have been placed in some medical journal and sent to us for perusal in our homes, at our leisure. But if on the contrary a full and free discussion follows, we go away amply repaid for any sacrifice we have made; we are refreshed and greatly benefited by this comparing of ideas and experiences, lifted as it were out of the ruts of routine work to the higher plane of progressive Ophthalmology.

So in the place of an address by your chairman we will immediately proceed to the work which is before the Section.

GRADATION OF LENSES.

Read in the Section of Ophthalmology at the Forty-third Annual meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY DUDLEY S. REYNOLDS, A.M., M.D.,

PROFESSOR OF OPHTHALMOLOGY, OTOLOGY AND MEDICAL JURISPRUDENCE IN THE HOSPITAL COLLEGE OF MEDICINE, MEDICAL DEPARTMENT OF THE CENTRAL UNIVERSITY OF KENTUCKY; SURGEON TO THE EYE AND EAR DEPARTMENT OF THE LOUISVILLE CITY HOSPITAL.

The gradation of lenses has been a perpetual source of discontent amongst all those who seek scientific accuracy, and the want of a uniform system is universally recognized. I had the honor, at the Ninth International Medical Congress, to read a brief paper on the necessity for reform in the manner of designating lenses, and in conclusion, I suggested the propriety of designating them according to the angle of refraction, as for example: begin with a lens the refracting powers of which equal an angle of 15′; the next in the series 30′; 1°; 1° 30′; 2°; 2° 30′ etc., up to the maximum angle of deviation of the pencil of refracted light. At the Cincinnati meeting of the American Medical Association, in May 1888, I presented the subject in a brief review of the principles, upon which lenses are constructed, and presented a table embracing a series of forty-two lenses, graded in minutes and degrees, according to the angle of refraction as determined by the angle of deviation the lens produced in a point of light transmitted through a frosted disk. The value of a lens must of course depend upon its angle of refraction, whether it be a prism, cylinder,sphere or a combination. If we adopt the method of gradation by the angle of refraction, we shall have no more such confusion, as the student must encounter in his attempts to determine the relative value of the metrical, the so-called inch system, or those denominated in fractions of the radius of the quadrant.

Professor Loring says, in discussing the subject: "The metre is taken as the unit, and each metre is called a dioptric. As the French metre is equal to thirty-seven inches, 1 D. = $\frac{1}{37}$ expressed in the old style." Dr. Claibourne of New York, suggests that, "the dioptre is equivalent to $\frac{1}{36}$ or $\frac{1}{40}$ according as the French or English inch is taken as the standard." Professor Landolt says: "One dioptre is to be taken as 37 Paris inches, or 39-5 English inches."

In England, distances are measured,as in the United States, by lines,inches,feet and yards, linear measure. In France, and some other countries, which have adopted the French system of millimeters, centimeters and meters, the metrical system of grading lenses harmonizes with this method of linear measurement, but it does not harmonize with either the English or American methods of linear measurement. To show how far this confusion extends, I invite your attention to the following, from Professor Noyes recent text book on diseases of the eye (p. 91): "I have noted with the same optical error uncorrected, say 1 D. or 2 D., differences of vision varying between $\frac{20}{40}$ and $\frac{20}{100}$". All through the literature of this subject, are found just such confusing statements. Now, the state of vision, according to Professor Snellen's method,is determined by ascertaining the capacity of the eye to perceive objects under a definite angle, illuminated by parallel light. Assuming that the range of accommodation does not extend quite so far as twenty feet, this is taken as the proper distance, beyond the range of accommodation, where objects may be placed for the determination of the refraction of the eye, and the relative acuity of vision with parallel light. Twenty, therefore, meaning English feet, is the numerator, and the size of the test object for determining the angle of vision, the denominator of the fraction used to express the state of vision, uninfluenced by the accommodation.

The fractional system of dividing the quadrant of the crown glass sphere has become part of the classical literature of mathematical science. It was used for designating lenses for spectacles, beginning with Friar Bacon, about 1282, descending in unbroken lines, until 1867, when the International Ophthalmological Congress, held at Paris, appointed a committee to investigate and report in favor of a uniform system of designating lenses. The Committee reported in favor of the metrical scale of focal lengths, having an interval equal to a lense of two hundred and forty centimeters focus. Since that time, Pœtz and Flohr of Berlin, with their lenses graded in Prussian inches of focal lengths, and Nachet and Son, with their series, graded in Paris inches, have no longer just grounds of dispute with English opticians, for they too, have adopted the metrical scale of grading lenses, still measuring distances by the old English standard, and recording results by the haphazard methods of unreasoning custom.

Dr. Edward Jackson of Philadelphia, deserves the thanks of the scientific world for his successful work

in advocacy of the adoption of the angle of deviation of refracted light as a test of the value of prisms. Following this line precisely in the footsteps of Dr. Jackson, we shall be forced to adopt the angle of refraction as the test of value of all lenses, and we should designate them accordingly, in minutes, and degrees, thus harmonizing the practical application of the science of optics with those principles employed in the determination of the optical properties of the human eye, with the same mathematical principles elucidated by the great Astronomers and Mathematicians of the world.

Now suppose we reverse the order of calculating the radius of curvature by dividing the quadrant of the sphere, and substitute the point of positive infinity as the beginning of our scale of gradation of refracting lenses?

To begin this way, we avoid the inharmonious arrangement of taking a medium refracting power, one meter in focal length, as the unit, and we likewise avoid the difficulty of securing a uniform medium as an index of refraction for the construction of our test lenses, and those we prescribe for our patients.

It is a fact, that we do require of the optician, a lens having equal angular refraction with our test lens, and we do not require a specified medium out of which to construct the lens prescribed for the patient; it follows, therefore, that we reject the lens measured by focal length merely, as determined by any fixed standard of radius in the grinding tools, and require the crucial test of refracting power. Then, let us so determine our scale as to begin with parallel light, and denominate the refracting media according to their power to deviate that light in angular terms of minutes and degrees. The greatest confusion results from the common habit of writers and practitioners using the denominator of the fraction of the radius as synonymous with so many inches of focal length. It is just as common to observe practitioners using some of the cheap imitations of Snellen's test types, not one of which have either corresponding size or form of the original. I have measured the letters in a large number of so-called reprints and found none of them even approximately like Snellen's. Tests of acuity of perception and angle of refraction in the eye must always correspond, but this can never be possible without correctly graded test lenses, correctly graded test objects, and apportionment of distance in terms harmonious with the mensuration employed in grading the angular distances of test objects, and refraction of the test lenses. Neglect of these essentials impairs the value of nearly all the published statistical tables of clinical observations on all the varying forms of ametropia.

WHAT MAY BE CONSIDERED NORMAL CORNEAL ASTIGMATISM? FROM KERATOMETRIC MEASUREMENTS OF THREE HUNDRED EYES.

Read in the Section of Ophthalmology at the Forty-third annual meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY H. V. WÜRDEMANN, M.D.,
OF MILWAUKEE, WIS.

Keratometry is now considered an essential to the examination of the ocular refraction. As the principal seat of astigmatism is in the cornea there can be no doubt but that the measurement of its curvature is both time and labor saving; and in the near future this fact will be appreciated by every reputable ophthalmist. Correction of refractive errors is the most scientific portion of an oculist's work and cannot be done properly without several means of objective examination.

The ophthalmometer of Javal and Schiötz is conceded to be the most practical instrument for the estimation of the corneal curvature. In the accompanying instructions,[17] in treatises and text books, the corneal is taken as equal to the whole astigmatic error. In 1882 Javal reported[11] that in the measurement of 100 eyes in 96 per cent. the corneal corresponded exactly with the total astigmatism. His associate Nordensen[16] followed later with a report of several hundred more, giving the same average. Since that time this statement has been accepted by most writers.

In 1889 Swan Burnett said[3] that his experience with Javal's ophthalmometer tended to substantiate this although his percentage of difference between the total and the corneal astigmatism was greater. A few months ago the same author wrote[4]: "It is a fact that we seldom find a cornea without a measurable degree of astigmatism." Normal corneal astigmatism he would place at .25 or .50 D. according to the rule. G. Lindsay Johnson says[13] that the majority of persons possess a corneal astigmatism of less than .75 D. Bull finds[2] an astigmatism of from .25 to .75 D. with the rule in 80 per cent. of his cases. Doubtless many others* have noticed the disparity between the corneal and total measurements but have not published their observations. However this may be it seems marvelous that the statement of Javal has gone so long unchallenged.

The usual directions for keratometry with the ophthalmometer are: After finding the direction of the principal meridians to carry the movable plaque toward the stationary until the images touch and to judge of the degree of the astigmatism, after turning to the meridian of less refraction, by the number of overlapping steps.[17-8] This method is open to the objection of inaccuracy in that the personal equation of each observer admits of an error which may amount to .50 or 1.00 D. It will do very well for rough work but closer results may be obtained, by first approximating the plaques and finding the direction of the astigmatism, then moving the stepped plaque until the images of the first two *black interspaces* are equal. It is objected by Weiland[21] that the refracting quartz prism of the telescope is not achromatic, so that the edges of the images are not sharply defined, making it impossible to get accurate contact. One can more accurately estimate the size of two black objects than judge when two white surfaces exactly touch. Of two equal squares, the one white on a black back-ground, the other black on a white back-ground, when contrasted the former appear larger. The edges of white objects when approximated appear to merge into each other

* After this article was written I came across the following by a writer in an English ophthalmic journal. He published the astigmatism found by the ophthalmometer in 120 eyes, and in a parallel column the cylindrical lenses finally agreed upon as the proper ones, after comparison of results obtained from the ophthalmometer, test lenses, ophthalmoscope and retinoscope. In 62 eyes he claims that the ophthalmometer indicated exactly the true amount of astigmatism. In 14 the discrepancy was but .25 D., and in 26 it was a whole diopter or over, the greatest difference being 3 D. He says that in many cases in which the instrument showed .50 D. cylinders were not prescribed. John B. Story, in the Ophthalmic Review, vol. x, No. 117.

before they actually touch. The refractive values should be read off on the arc, and the differences of the principal meridians noted, as was suggested by the inventors.[12] For accurate determination of the central astigmatism it is essential for the visual line of the subject to exactly coincide with the optical axis of the instrument. I usually request the patient to steadily observe the reflected image of his own eye in the center of the objective. Such varying reports on the relation of the keratometric to the other measurements as given by Chibret,[6] Bull,[2] Burnett,[4] Story,[18] Ostwalt[18] and others may be accounted for by the personal equation of each operator and by the manner in which the examinations were conducted.

Astigmatism is present at each *point* on the corneal surface where the refraction of the meridians is unequal. Thus we may not correctly speak of "astigmatic zones" as is doneby Sulzer.[19] As a rule we recognize, for practical purposes, only the central astigmatism. This is located at the intersection of the visual axis (which may be considered the same as the line of fixation), and the cornea. (See Fig. 1.) Five degrees on either side of the fixation point usually serve for all purposes of the visual act. If this area be free from aberration we say that the eye is non-astigmatic.

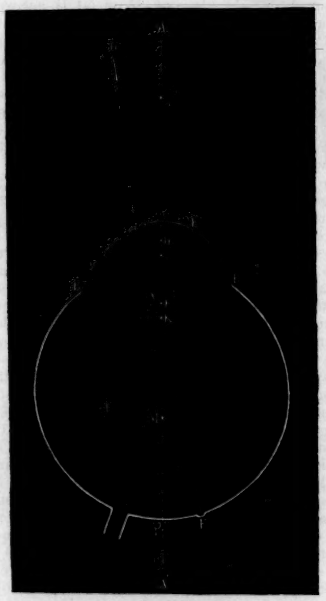

FIG. 1.—Angles alpha and gamma. (Landolt.)[14] A A, optic axis; O F, visual line; O M, line of fixation; E L, major axis of corneal ellipse. The line of fixation does not correspond with the optic axis, but forms the angle O M A, angle gamma, nearly equal to the angle O X A, formed by visual line with optic axis. O X A may be considered as the angle gamma. The visual line does not pass through the summit of the corneal curve E, but forms with the axis of the cornea E L, the angle O X E, the angle alpha.

All corneæ are highly astigmatic in the periphery, and unless the visual axis bears an unusual relation to the axis of the cornea, their centers are moderately astigmatic. In most cases the curvature of the vertical diminishes more rapidly than that in the horizontal meridian. Thus in certain subjects we find central astigmatism with the rule, and at five or more degrees away from the visual axis it is against the rule. Fig. 2 represents the corneal measurements of an eye in which all other forms of examination failed to show the slightest ametropia.

The refractive values were obtained by causing the subject to look intently during the examination at points 5° removed from each other on the ophthalmometric disc along each meridian until the limits of the cornea were reached. (With a refraction of 40.00 D. this arc equals 0.7369 mm.) It will be seen that I have divided the surface of the cornea into zones, as was suggested by Aubert,[1] but with a modification of his plan. At 10° to 15° about the *corneal* axis (not the visual centre as Aubert puts it), the curvature rapidly flattens, dividing the surface into two true zones, the polar and peripheral. From measurements of a number of subjects I find the former ellipsoidal, its long diameter approximating the general astigmatic axis. The optical portion of the cornea does not accord with the polar zone. It is limited by the angular aperture of the pupil, which even when very wide may be considered to extend about 17° on either side of the center. In this case the center of the pupil corresponds approximately to the optic axis. The shape of the optical zone depends upon the form of the pupil, being usually ellipsoidal, with the long axis within 20° of the vertical. The peripheral portion of the cornea is bounded by the limbus, and may be called the scleral zone.[1] The visual center is usually found in the nasal quadrant of the optical zone, its position depending upon its relation to the optic axis. This is determined by a decentration of the crystalline.[19] In the examination of twenty-two eyes Sulzer found considerable variance of the pupillary center to the axis of vision. (See Fig. 3.) The amount and kind of astigmatism is influenced by the relative position of the visual axis to the different quadrants of the polar zone. For instance, if in Fig. 2 the visual line had passed 5° more to the nasal and lower portions of the optical zone, there would have been no central corneal astigmatism ; if 10° higher, it would have been against the rule. In high myopia the angle gamma may be negative, the visual axis will then pass through the cornea to the temporal side of the axis of rotation. The two may coincide in lower degrees of myopia, or in hyperopia the visual line may be even more to the nasal side.[7] In this subject the angle gamma was positive, the optic axis being about 4° outward and 1° downward from the visual center.

The amounts of the normal lenticular, and proportionately that of the normal corneal astigmatism, appear to be greatly influenced by the size of the angles gamma and alpha. This factor is also an important element in modification of astigmatism from other causes. At a future time I hope to report more fully on this subject. In the diagram (Fig. 2) there is shown a central astigmatism of .50 D. in the vertical meridian. We see that the astigmatism remains with the rule within an area of 5° around the visual center. At the lower and inner portions of the optical zone the cornea is non-astigmatic, as is shown by the shaded area on the chart.

On account of the more rapidly diminishing curvature in the vertical meridian, in the scleral or periph-

eral zone the astigmatism becomes *against the rule*, until at the superior margin of the cornea it amounts to 3.00 D., and at the lower border is 5.00 D. against the rule. On the contrary, in the horizontal diameter the astigmatism gradually increases *with the rule*, being at the nasal limbus 7.00 D. and at the temporal 9.50 D. with the rule. Outside of the optical zone the axes of the principal meridians deviate from 90° and 180°; these axes in places are not at right angles to each other. This is due to the irregular curvature

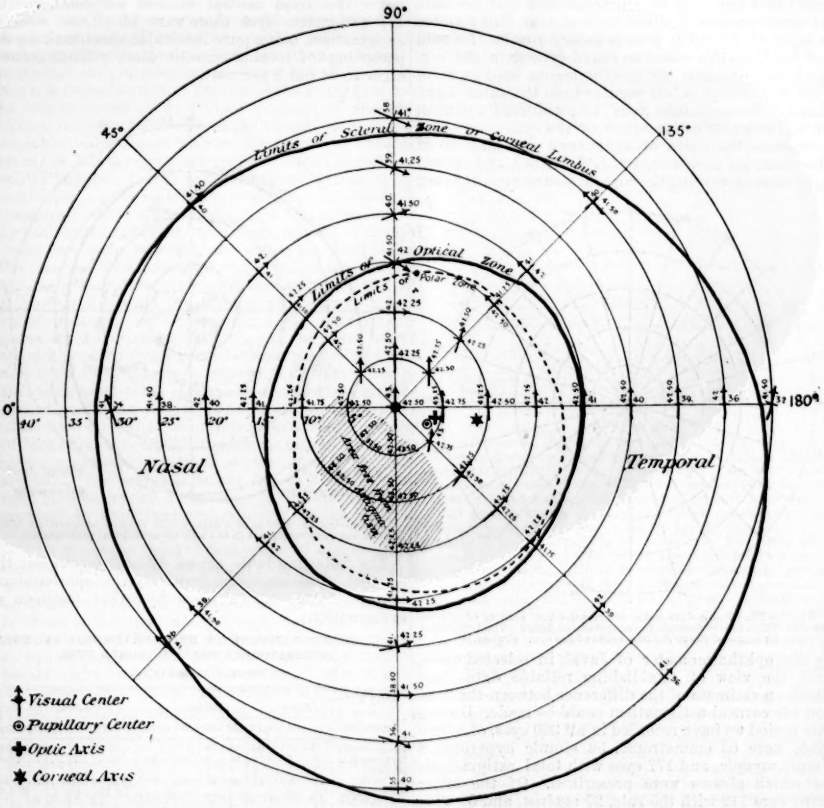

FIG. 2.—Keratometric diagram of normal cornea of an emmetropic eye, showing values of corneal refraction and directions of the astigmatic axes on the principal and oblique meridians.

of the scleral zone. In the horizontal and oblique meridians we find less variation. Within the optical area of corneæ with oblique central astigmatism we may find the axes to vary in a surprising manner.

In Fig. 4 there is shown the optical zone of a cornea with central astigmatism of 3.25 D. at 30°. Five degrees down on the vertical meridian there is 3.25 D. at 75°, and the same distance up, 1.00 D. at 135°. Outwards it is 4.50 D. at 60°, and inwards 3.50 D. at 75°. All of these measurements are within the area used for distinct vision. At 10° in all directions from the center of vision the astigmatic axes tend toward the direction of the meridian upon which measured, at 15° away almost coinciding. It is seen that this corresponds to the emmetropic eye in that the curvature diminishes more rapidly in the vertical than in the horizontal diameter, making the peripheral astigmatism *against* in the vertical and *with* in the horizontal meridians. These changes in the directions of the principal meridians (denominated "meridional astigmatism" by Jackson),[3] show the physical impossibility of bringing up the visual acuity to the normal in most cases of oblique astigmatism. In this subject the optic axis was found to be 2° obliquely downward and outward of the visual center, and the corneal axis 5° diagonally downward in the opposite quadrant.

Degrees of corneal astigmatism of three or four diopters may be produced by the visual line passing eccentrically through the cornea, and I am convinced that this is one of the principal factors in its production. It is true that many corneæ are congenitally

deformed, and that others become so through the effects of inflammation or ulceration. The defect may also be due to the mechanical effect of the recti muscles or some extraneous cause. I have seen 5.00 D. against the rule appear after a cataract extraction and 2.00 D. after an advancement of the recti muscles, and the same has been noticed by others.[5] The amount of monochromatic aberration in the horizontal meridian of the cornea has been worked out[6] by Prof. Harkness to amount to about 1.00 D. in a pupil of 4 mm. In his report he said that the data he could procure for the vertical meridian was too meager to allow of a satisfactory result. I doubt not but that this would be found greater in the vertical meridian, for my measurements tend to show that the vertical is less regular than the other meridians. These changes must be considered a portion of the irregular astigmatism of the eye.

Between the dates of February 1 and May 20 of this year, my associate, Dr. J. S. Barnes, and myself have been preserving the corneal measurements taken

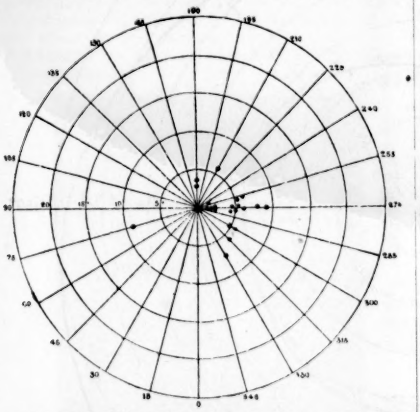

FIG. 3.—The black points indicate the pupillary centers of 22 eyes The visual line passes through the center of the figure. The left side of the diagram corresponds to the nasal side of the eye. (Sulzer.)[19]

by the ophthalmometer of Javal, in selected cases, with the view of establishing reliable data upon which an estimate of the difference between the total and the corneal astigmatism could be made. During this period we have recorded in all 300 eyes, of which there were 63 emmetropic, 52 simple hyperopic, 8 simple myopic, and 177 eyes with total astigmatism for which glasses were prescribed. Of the latter there were 119 with the rule, 27 against, and 31 with the axis oblique—making 177 astigmatic and 123 non-astigmatic eyes. These were examined by the ophthalmoscope, skiascope, ophthalmometer and the subjective tests (90 per cent. of the ametropic eyes being examined under homatropin or atropin), for the detection of visual error. Of the whole number, in 279 (93 per cent.) the corneal differed materially from the total astigmatism, being equal in only 7 per cent. All of the emmetropic eyes showed a difference, from a little less than .25 to .75 D. Of the simple hyperopic but 4 per cent. had the same; of the myopic all were equal; and in the eyes with total astigmatism 19 (10.75 per cent.) had the corneal equal to the total error, while in 158 cases (89.25 per cent.) there was a difference. In two cases the disparity between the corneal and total measurements was sufficient to change an error shown by the ophthalmometer as *with* the rule to *against* as given by the other tests. All of the emmetropic, myopic and hyperopic eyes had central corneal astigmatism. The number of simple myopic cases was too small to formulate any rule, but we may safely say that emmetropic and simple hyperopic eyes are seldom or never free from central corneal astigmatism. Of 177 astigmatic eyes there were 14 without corneal astigmatism, being pure lenticular cases, making my percentage of total astigmatic cases without corneal error to be but 8 per cent.

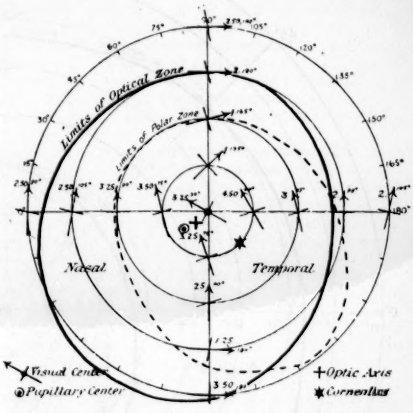

FIG. 4.—Optical portion of a cornea with central astigmatism of 3.25 D. at 75, showing variations in the axis of meridional astigmatism.

The following table shows difference between the amount of astigmatism found by the ophthalmometer and that agreed upon by other methods of examination:

TABLE SHOWING DIFFERENCE BETWEEN CORNEAL AND TOTAL ASTIGMATISM IN THREE HUNDRED EYES.

Total Refraction.	Equal.	Greater.					Less.					Totals.
CORNEAL ASTIGMATISM. Amounts	0	.25	.50	.75	1.00	over	.25	.50	.75	1.00	over	
Emmetropia	20	34	9									63
Hyperopia	2	11	26	7	4	2						52
Myopia		3	4	1								8
As. with	9	17	50	35	6	2						119
As. against	4						7	10	1	1	2	25
Tot. against												
Cor. with			2									2
Ax. 45°–135°		3	2	1								6
Ax. 15°–165°, 75°–105°	3	3	2	3	1			4				19
Ax. 30°–150°, 60°–120°	3	1	1	1								6
Totals	21	58	122	56	13	5	7	10	5	1	2	300

In adults there was usually a *surplus* of .50 D. when the astigmatism was *with the rule*, and when *against the rule*, the corneal value was the same amount *less* than the total error. In children the average difference was .75 D., and in old people .25 D. Most of the cases where the corneal tallied with the total astigmatism were found in the elderly; when the

meridians are oblique the measurements more nearly agree. This should be accepted as a very general statement, as the astigmatic aberration is modified both by the amount of lenticular decentration and the kind of general ametropia. In myopia the angles alpha and gamma may be smaller or even non-existent, in hyperopia larger; thus in the former the normal corneal and lenticular astigmatism is less, and in the latter larger. There is no doubt in my mind but that this difference is neutralized by a corresponding lenticular astigmatism of the opposite kind. This has been mentioned hypothetically by others, but I have never yet seen a refutation of Javal's statement relative to the identity of the corneal with the total astigmatism. Normal lenticular astigmatism is always *against the rule*. It has a definite relation to the size of the angle gamma, having its origin in the oblique position of the lenticular refracting surfaces to the visual line D. The decrease in difference between the total and corneal errors in old subjects, may perhaps be explained by senile changes in the lens structure increasing its refraction. I do not believe in the production of "spastic" lenticular astigmatism by irregular or partial contraction of the ciliary muscle, although cases have been reported[15] in[16] which the total astigmatism has been increased under full mydriasis. I believe with Sulzer[19] that when the size of the pupil is increased beyond the normal, as by atropin, that the zone outside of 5° from the visual axis participates in the ocular refraction, and in cases where there is a marked difference between the error of this and that of the center, a change may take place in the amount of total astigmatism under mydriatics according to the degree of corneal asymmetry. I allow that "tilting" of the lens[2] exists[15] as a cause of lenticular error, but consider the explanation here given a preferable view of *normal* lenticular astigmatism. The few cases where the axis of the total astigmatism varied from that of the corneal may perhaps be explained by obliquity of the lens, as suggested by Tscherning.[20]

It is generally held[3,7] that much of the irregular central astigmatism of the eye lies in the lens. I would ascribe some of this to the cornea as well. In fully a quarter of my own measurements the directions of the principal meridians but a few degrees removed vary from that of the visual center. Even in the optical zone the principal meridians may not be at right angles to each other. (See Fig. 4.) In consequence of this irregularity it is impossible to fully correct an astigmatism by cylndrical lenses, and such a correction must always be considered an approximation.[19] There is a certain amount of amblyopia due to astigmatism and this is in proportion to the amount of corneal asymmetry.[15]

In such an imperfect and variable an instrument as the human eye, where in one person of sensitive nervous organization a total astigmatism of .125 D., against the rule, gives rise to eye-strain, while in another doing the same amount and kind of work an astigmatism of even 2.00 D. is tolerated with impunity; where shall the line be drawn? What may be considered normal corneal astigmatism? I regard that amount of corneal astigmatism as normal which is neutralized by a corresponding lenticular astigmatism of the opposite kind. This is equal to the difference between the total and the corneal measurements, which may be considered a corrective effort on the part of nature in neutraiizing a certain amount of lenticular error. In the use of the ophthalmometer in glass fitting I am prepared as a general rule to deduct .50 to .75 D. from its readings in children and .25 to .50 D. in adults when the meridian of greatest refraction is vertical, and when this is horizontal to add the same amounts in estimating the total astigmatic error. When this meridian is at 45° or 135° the corneal and the total errata will be about the same; when at other angles a greater or less varience is to be expected according to the relative nearness of the principal meridians to the vertical or horizontal. Where no central corneal error exists I expect to find astigmatism against the rule.

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Discussion.

Dr. Henry D. Noyes, of New York:—I am able to say something with reference to the objective determination of astigmatism from seven years' experience with Javal's ophthalmometer. I have looked at not less than five thousand eyes and have made records of what I have seen. I shall simply speak of a few practical points which have been elicited by the very accurate description given by the reader of the paper. The irregularity of the form of the cornea is very well known and it is equally well known that it does not yield itself to any proper mathematical formula. It is also true that only the central portion is available for accurate vision and that has two practical corlolaries. In the first place it means that the vision which we can expect to obtain by the operation of iridectomy must necessarily be imperfect because of the irregularity of the cornea, provided the central portion is excluded. If the central portion remains in use, it does not follow that the irregularity of the curve will have a great depreciating influence upon vision. This is demonstrated by the results of extraction of cataract with or without iridectomy, and it is a fact that equally good results may be found after extraction of cataract with iridectomy as when no iridectomy has been done.

A notable instance of this came under my notice not long ago. A man 50 years of age had had extraction performed by a friend and his visual acuity was 20-18. I found on examination of the cornea that there was astigmatism of about 1 D., and when that correction was added to his glasses his vision rose to 20-12. The difference is small but it shows that the central portion of the cornea was by all odds the dominant portion.

The value of the ophthalmometer is higher than is generally supposed. For example, Javal said that it gave the total error within about 1 D., but my experience is that it gives you the lens to within about .50 D. Many times it gives the exact error and the glass required so far as the cylinder is concerned. This has been illustrated to me many times and a case occurring within a week is in point. This individual had worn cylinders for two years but they had been changed at different periods. The ophthalmometer showed in one eye astigmatism of 1.5 D. and in the other 1.25 D. He had never worn cylinders of more than .50 D. He

would accept a cylindric correction amounting to what the ophthalmometer gave provided the correction consisted of both a plus and a minus cylinder. He was an example of mixed astigmatism. Mixed astigmatism has been shown to exist in a larger percentage of cases than was formerly supposed.

It is also true that vision, when the astigmatism is found in the oblique meridians is rarely made normal, whether these meridians have a symmetrical relation to the median plane or not.

Another fact that is brought out by the examination with the ophthalmometer is that the principal meridians of the cornea are, in some instances, not at right angles with each other. One may be at 90°, while the other is at 30°. One may be at 80° and the other at a point less than a right angle to the first. The consequence is that you have to adjust the axis of the cylinders according to what the patient will accept, and not according to what the ophthalmometer shows to be the true condition. In other words the determination of what the patient must wear is a practical question and is to be determined by experiment. The value of the ophthalmometer is to show the lines within which the experimentation must proceed. With the knowledge which a little experience gives and with a careful observation of the facts which the ophthalmometer has shown, you will rarely fail to discover any important error.

Another point is that the use of the ophthalmometer has greatly diminished the necessity for a mydriatic. The employment of a mydriatic I am confident should be limited to cases in which the amount of pain and severity of the subjective phenomena make you feel that an anodyne must be applied, and here the atropia is employed rather as an anodyne than for the purpose of enabling you to determine the refractive error.

In my work I rely chiefly, first, upon the ophthalmometer, second, upon direct examination with the ophthalmoscope with the glass determined by the ophthalmometer placed behind the mirror, and then I go to the test box to ascertain what can be done to bring the acuity of vision up to the normal.

These are some of the practical points relating to this subject of astigmatism, and which enable us by proper objective methods to make the subjective examination less trying to the physician and patient than was formerly the case.

Dr. Samuel D. Risley, Philadelphia:—In entering upon a discussion of this important branch of ophthalmology, I should like to emphasize a significant remark made by Dr. Noyes, that after the use of the ophthalmometer the glass which is to be prescribed is the result of testing rather than of the scientific data obtained by the ophthalmometer. This is strictly in accordance with my own experience. The glass to be prescribed is the one selected by the patient as giving the best acuity of vision.

In reference to the use of mydriatics. In my experience, the majority of persons who come with asthenopia, fall in the category mentioned by Dr. Noyes, that is, they have pathological states of the chorvia and retina which call for the use of the mydriatic for its therapeutic effect. Moreover in these cases, a mydriatic is required to get at anything like accuracy in estimating the error of refraction. Without it, different results are obtained on successive days. If the mydriatic is used the results are the same at different examinations, and if the mydriatic is continued, vision, which at first was below normal, because of the accommodative retino-chloridal irritations and turgescence, will come up to the normal standard, as this condition subsides under the enforced rest and sedative influence of the drug.

Dr. G. C. Savage, Nashville, Tenn.:—Astigmatism can be corrected either by lessening the curvature that is too great, by means of a concave cylinder, or increasing the curvature that is too small by means of a convex cylinder. I am on the floor to advocate the claims of the mydriatic. In many cases the patient will take a concave lens in preference to a convex lens, when actually the convex lens is the one that is needed. The ciliary muscle is often unruly and I am not willing to refract a case in a young person where this muscle is allowed to run riot. There is no harm in using a mydriatic. There seems to be a disposition to discard its use and that is what the people want. The mydriatic does no injury, while it enables us to do accurate work. Without a mydriatic I should not be willing to undertake the refraction of the eyes of a young person.

Dr. Eugene Smith, Detroit:—I am one of those who find it unnecessary to use a mydriatic as much as formerly. With the ophthalmometer, the retinoscope and the ophthalmoscope, I have, within the past two or three years, found myself using mydriatics more and more seldom every month.

In regard to the peculiar axis in using the ophthalmometer, I find that sometimes we are careless in letting the patient twist the head from the one side to the other and we do not find the same axis in the two eyes. When I find that the axes are inclined to be parallel or do not agree, I frequently do the work over and find that the mistake was my own and not due to the differences in the two eyes.

I have so far heard nothing particularly said in regard to retinoscopy or skiospy. These are not depended upon as much as they should be. Dr. Noyes says that he uses the ophthalmometer, then the ophthalmoscope and then goes to the test glasses. I go further, I take the ophthalmometer, then the ophthalmoscope and then the retinoscope, but in the large majority of cases I do not find it necessary to use a mydriatic in retinoscopy. Some think that they must use it in every case. With me, its use is decidedly the exception rather than the rule. I also use the direct method with the ophthalmoscope after the method mentioned by Dr. Noyes of fitting the cylinder into the ophthalmoscope. I however, use the optometer of Cooper, of London. I find it superior for retinoscopy.

In regard to what is normal astigmatism, I should consider normal astigmatism to be that degree which produces no trouble, that is where you do not know whether it exists or not. Where a patient comes with astigmatism, no matter what its degree, if there is asthenopia, I regard that astigmatism abnormal. In the majority of cases where it is corrected and there is no abnormal muscular condition, the patient gets well of the asthenopia.

Dr. A. A. Hubbell, Buffalo, N. Y.:—I have used the various objective methods of measuring astigmatism. I have great confidence in retinoscopy, and during the past few years I have also used the ophthalometer and found it a most valuable aid. My experience has taught me, however, that the higher the degree of astigmatism we find with the ophthalmometer the more should we under-correct it, in prescribing cylindrical glasses. In a conversation recently with Javal, he told me that he decreased the strength of the cylinder proportionately, the higher the amount of astigmatism shown by the ophthalmometer. If he found astigmatism amounting to 1 D. to 1.25 D. he would expect to prescribe O. 50 D. to O. 75 D.; if he found 3.00 D. he would prescribe about 2.25 D. and so on. I have noticed recently[1] an article in the Philadelphia *Medical News* by Dr. Willman, in which some mathematical calculations have been made, showing the errors of Javal's ophthalmometer, and these errors nearly correspond with the differences which Javal himself made between the cylinders used, and the astigmatism indicated by his instrument. Javal has tabulated the cylinders that should be prescribed in the various readings of his instrument in his work on ophthalmometry.

Dr. H. V. Würdemann, Milwaukee:—We cannot have too many means of objective examination. In my opinion the ophthalmometer is our most exact instrument in the search for astigmatism except in favorable cases under a mydriatic with the skiascope.

One of the gentlemen spoke of normal astigmatism. My subject was normal *corneal* astigmatism, that is the difference between the total astigmatism and the corneal astigmatism.

In the lower grades of corneal astigmatism in the emmetropic, hyperopic or myopic eye, the ophthalmometer will give too much or too little according as the astigmatism is with or against the rule. In the higher grades, the ophthalmometric measurements are greater than the glasses prescribed. For instance if this is 3.5 D. the ophthalmometer may give much more than that amount. I have ascribed this to my indisposition to fit fully correcting lenses in hypermetropic astigmatism and I generally under-correct. I allow a certain amount for the wishes of the patient, averaging the results of all the tests, but do not place too much stress upon his preference when against the objective tests.

LEG ULCER.—Dr. Weismueller praises the action of a dusting powder thus composed:

℞—Acid salicyl., ʒiv.
Acid borici., ʒij.
Zinci oxidi, ℥ss.
Amyl,
Talc., ää ʒv. M. ft. pulv.

[1] Note by the author. Dr. Hubbell probably refers to the article by Carl Weiland, M.D.[21]

A METHOD OF EXAMINING THE EYES OF SCHOOL-CHILDREN.

BASED ON THE STUDY OF THREE HUNDRED AND FIFTY-SIX BOYS IN THE WILLIAM PENN CHARTER SCHOOL.

Read in the Section of Ophthalmology at the Forty-third annual meeting of the American Medical Association, held in Detroit, Mich., June, 1892.

BY B. ALEX. RANDALL, A.M., M.D.,
OF PHILADELPHIA, PA.

Threadbare as this subject may appear to anyone who, without special interest in it, has noted the appearance of hundreds of papers on the matter, and has, perhaps, been disgusted at the wide discrepancies of views and results which they too often reveal; it is, nevertheless, one of great importance to us, as citizens and ophthalmologists, and it is likely to demand more, rather than less, attention in the future. All its aspects have claims upon our interest and study, but many of them belong to the Section on Hygiene and State Medicine rather than to the Ophthalmic Section. I wish here and at this time, to formulate some views as to the methods of investigation which have been impressed on me as best by a dozen years of study, in the hope that any future investigators may profit, as they too rarely have in the past, by the experiences of their predecessors.

Few will question that the school should elicit and develop the mental aptitude of the scholar, revealing, and if possible, correcting his weak points; and the time is past when its relation to the physical condition can be neglected. Nor is it enough that *damage* to the individual during the educational process should be avoided—that the "overburdening of the scholars," of which so much has been said, should be prevented from producing "school myopia", scoliosis, or the many other ills more or less fairly laid to its charge. Physical education and development is demanded as a part of the school régimé; and the scholar ought to be made a "better all-around man," as well as mentally drilled for a special career, if he shows aptitude or has decided on one already. At the least, any disqualifying physical infirmity should be discovered, and opportunity given to remedy it or avoid its effects. Knowing that four per cent. of all boys are more or less color-blind, it is our duty to find out which are the unlucky ones and not leave them to discover it in some disastrous fashion. Time and again I have known candidates for the navy, who were exceptionally good scholars, possessed of splendid physique, coming long distances, and perhaps wasting much time and money in special preparation, only to be incontinently rejected as color blind, and sent home as completely discomfited as though they had been proved imbecile.

It is a matter for great congratulation that the subject of the physical education of the pupils in the schools is now receiving growing consideration. Most colleges have placed their gymnasia and athletic sports in the care of someone more or less fitted to restrain, as well as to promote, the exercises of the scholars. Scientific methods of physical examination and development have made increasingly good results possible; and in most of these institutions systematic exercise is reducing the number of the weaklings, guiding and controlling to good purpose those aspiring to be athletes, and, still more important, is raising greatly not only the standard of muscular strength, but also the good health and mental capacity of the main body of the students. Similar results are being gained in the public and private schools, and will grow still more common as the advantages become more manifest and they vie with each other in their efforts to attract pupils.

Such a semi-annual physical examination, made in the William Penn Charter School of Philadelphia, last Autumn, furnished the results which form the text of my present paper. It was made by the Director of Physical Education as to all details of height, weight, girth of chest and limbs, and the dynanometer and spirometer results; and by a physician, Dr. Spenser Trotter, as to the medical aspects, such as the auscultation of the heart and lungs, and the condition of the eyes and ears. This latter part I undertook for him, as he was in doubt as to the best practicable methods; and it is in the belief that an account of it may be of value to others having such work to do, that I now make this report.

Every such examination is fraught with great difficulties. A certain number of parents will be found hostile to it, regarding it as an invasion of their American liberties and as prompted solely by sordid motives on the part of the examiner. Great prudence must be used in answering any of the questions, general or personal, which are asked by the scholars; and no report should be made, as a rule, except the official one to the school authorities. Much time and labor must be expended upon it, with the consciousness of having done useful and scientific work as the only reward; and the man who begins enthusiastically is apt to find the task very wearisome, and the sacrifice of time and energy a very severe one, before it reaches its close. For this reason a clear understanding of what should be learned, and a knowledge of the great shortcomings of the many examinations thus far made, are prerequisites to the undertaking. Too extensive a work should not be attempted; while on the other hand, although hundreds of thousands have already been examined, there is need for much further and better study, especially of small groups, repeatedly investigated.

My purpose was to obtain results that should be practically and scientifically valuable. Subjective tests, therefore, constituted but one part of the investigation; and, as time was an important question for all concerned, the methods to secure systematically full and accurate results were very important. A critical study of nearly every one of the two hundred or more examinations which have been made, and some previous experience in applying the ideas derived from them, as to what is desirable and practicable, have convinced me of the necessity of some tests, and the worthlessness of others commonly employed. The method pursued, closely similar to that used by Risley in 1879–80 and by myself in 1884, and now recommended, is as follows:

An accurate test card and astigmatic chart, such as Wallace's, are placed 6 meters away from the seat to be occupied by the pupil, well illuminated by an argand burner a half meter distant, which is hid from view by a black screen, perforated so as to give a point of light for muscle tests, and quartered with white lines to indicate the amount of any deviation found. Behind the pupil another argand burner furnishes light for tests of the near vision and for ophthalmoscopy and retinoscopy. The room is otherwise darkened by drawn shades. The Maddox prism or rod, a "prism mobile," test glasses, Holmgren wor-

steds, ophthalmoscope, etc., must of course be within easy reach. Well-planned blank forms should be used for recording systematically and completely every result of the study; and much time and labor can be saved by a competent assistant, but most valuably as a mere clinical clerk, leaving all actual tests to the examiner himself.

Working upon this plan, the distant vision is first determined, each eye being screened in turn by a black card, and the subjective recognition of astigmatism tested upon the radiating lines, which should be the parallel bands of Green, not the simple radii. The muscular balance is then tried for the distant point of light, and any deviation measured by reference to the lines upon the screen or by the interposition of the prism mobile. The near vision for fine type, usually D. = 25, is then tried and the punctum proximum carefully noted, with the p. r. in myopia, etc. The Graefe test with a very fine dot-and-line, or the simple test which I have advocated (Trans. Amer. Ophth. Soc., 1889, *Medical News*, September 7, 1889), of estimating the amount of movement of the eye from a position of rest under cover to that of fixation upon the fine object to which the fellow eye has been directed, will give prompt measure of any insufficiency of convergence, etc. The ophthalmoscope, in the upright image, gives the details of the eye-grounds, the condition of the media and the apparent refraction. The retinoscopy, with the plane mirror from 4 meters distance, gives delicate qualitative indication of the refraction, aided at need and made quantitative by a glass or two from the test case; and the test of distant vision, with any glass apparently required, or with that worn, often furnishes valuable data. The latter is quickly measured by neutralization, and when and how it was obtained learned by a question or two. A moment's use of the pen gives rude but valuable sketches of any anomalies of vessels, conus, etc.; the field can readily be taken in any case calling for it; the general and the ocular condition of health can be learned, with any note of inflammation of lids, conjunctiva or cornea, deviations of the eyes, apparent or actual, nystagmus, etc. A moment spent over the worsteds (on which each eye should be separately tested, and better by daylight), and unless the ophthalmometric measurements are desired, the examination may be terminated. In short, the entire examination usual in the office work of the careful specialist can be carried out; as it should be, if we are to learn the actual condition of the scholars' eyes—for every careful worker is aware that errors enough are possible even in the fullest and most scrupulously exact first study. Even when recording all these data myself, each examination could be completed in five minutes or less; and an expert observer, with a good clinical clerk, ought to be able to examine twenty or more in an hour.

As to the results of the examination, I shall shortly report elsewhere: it is sufficient to say that the results accord with those of my previous study of the eyes of medical students (Trans. Pennsylvania State Medical Society, 1885), and with the summarized results of all the previous investigations, as critically analyzed in my papers on "The Refraction of the Human Eye," *Amer. Jour. Med. Sciences*, July, 1885, and in the Transactions International Ophthalmological Congress at Heidelberg in 1888. There was a low percentage of emmetropia, few myopes, hypermetropic refraction predominated, and astigmatism was proved in nearly half the eyes. Color blindness was rare, being found in but nine cases, and there was only one case of retinitis pigmentosa; but a notable group of individuals was found where the conditions demanded prompt reference to their medical advisers for treatment of threatening disorders or the correction of serious optical defects.

SCHEME FOR RECORDING EXAMINATION.

School	Class	Date . . .
No. . . Name.	Age.	Sex . . . .
Condition of Health		
Condition of Eyes		
Distant Vision	O. D.	O. S. . . .
Astigmatic Lines	O. D.	O. S. . . .
Muscular Relation—Far.		Near . . .
Accommodation—Type.	O. D.	O. S. . . .
Color Perception	O. D.	O. S. . . .
Refraction—Ophthalmoscope	O. D.	O. S. . . .
" Retinoscopy. . .	O. D.	O. S. . . .
Eye-ground—O. D		O. S. . . .

Dr. Samuel D. Risley, Philadelphia:—I would urge with Dr. Randall the importance of this thorough and careful examination if the work done is to be of any scientific value. I do not believe that the simple cursory testing of the sharpness of vision and the determination of the manifest refraction by glasses give results of any value when compared with the thorough work suggested by the author of the paper. Unless sufficient care is exercised to secure approximately accurate results the work is practically valueless.

Such careful work gives data from which can be obtained the relations of the different refractive conditions to the pathological changes which accompany them. I am glad that Dr. Randall has brought this subject to the attention of the session.

Dr. Francis Dowling, Cincinnati:—I have been much interested in this subject of the examination of the eyes of school children. Three years ago, I commenced a series of examinations in the schools of Cincinnati in order to determine the percentage of nearsightedness among the scholars. The great difficulty is to get the consent of the principals of the schools to put a mydriatic into the eyes of the pupils. In the cases that I examined, I arranged to go on Friday night and drop in the mydriatic so as to have the eyes in fair condition for study on Monday. There was almost a crusade against me for my work. I made a report to the school board, and the paper was referred to the committee on hygiene, and that was the last I heard of it. If we could get the members of the school boards interested, we could do a great deal of good. There are many evils in the way of light, position of the desks, etc., that could be remedied, and a great deal of trouble saved. In one school, the light was so bad that 73 per cent. of the children were nearsighted. I called the attention of the principal to it and he had the desks altered, but after he had given the order the school committee ordered the desks back again to the old position. That is the trouble in trying to get anything like a scientific result.

Among the German scholars I found uniformly about one-third more of near-sightedness than among the English speaking scholars. The German books seemed to be largely at fault in the production of this larger amount of nearsightedness. I suggested to the school board the advisability in the next contract for books, to have the books printed in the latin characters instead of the German. I got most of the German members to come to my view after showing that in Germany most of the text books are printed from latin type.

Dr. B. Alex. Randall, Philadelphia:—I doubt if any further words are needed, as I have probably said quite enough in regard to the general aspects of the question. I hold the belief that this investigating of eyes presumably normal, such as we find in school children, is almost the sole way of understanding what constitutes the usual, if not the strictly normal, refraction of the human eye. It is from the investigation of large numbers in some such fashion that we are to obtain our basis from which to deal with the whole question of the correction of refraction-errors and other conditions which we regard as evils, and to gain a comprehension of other more strictly hygienic questions of school influences upon the eyes of the pupils. But these things should be carried out primarily with the intention of directly helping, guarding and protecting the children under examina-

tion, removing if possible the faulty conditions under which they work and picking out those who are unable to stand the pressure which their fellows can safely bear. The school authorities must be furnished with the results; the detailed reports must be made to and for them alone, that, as in the case to which I have referred, the individual results of the examination may be sent to the parents and guardians for them to act on as they see fit. It is through the school authorities that the examinations are to be made and to be utilized. They must be in such form as not to interfere too much with the school work; but we must do our duty in such a way as to get results that will not be worthless and misleading. In none of these cases of color blindness, retinitis pigmentosa, or other serious lesion, or of large refraction errors even with low vision, had the conditions seemed recognized in a previous examination. This is the condition in a large proportion of these examinations; and I fear that it is often so even when undertaken by men professing to be ophthalmologists. I have shown that a fairly complete examination can be made in a period varying from three to five minutes, and I hope thus to remove the excuses for slipshod work and to make clearer the methods of meeting the requirements of these cases.

MANIFEST AND LATENT HYPEROPIA.

Read in the Section of Ophthalmology, at the Forty third Annual Meeting of the American Medical Association, held in Detroit, Mich., June, 1892.

BY EDWARD JACKSON, A.M., M.D.,

PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC, SURGEON TO THE WILLS EYE HOSPITAL, ETC.

It has frequently happened in the history of medicine that to clearly formulate an idea so that it could be practically applied in farther study, and especially in order to enforce it on the attention of others, it has been given more prominence and more definiteness than it really deserved. This I believe has happened with the conception of latent hyperopia. Unquestionably latent hyperopia exists very frequently. But it probably does not exist so frequently, and to the extent that might be inferred from much that is said about it.

For several years I have made it a rule to ascertain as accurately as possible the state of refraction before using a mydriatic, especially in what seemed to be cases of hyperopia almost, or completely free from astigmatism. From my last three years' records of errors of refraction I have sought out all those in which a record was made of the manifest and after the use of a mydriatic of the total hyperopia. The summary of these, including 214 eyes, is presented in the following table:

TABLE I.

Age.	Having no Latent H.	Having Latent H.	Per. cent of H. Latent.	Amount of H. Latent.
15	79%	21%	30%	0.70 D.
20	79	21	26	0.45
25	77	23	24	0.57
30	64	36	33	0.62
35	62½	37½	26	0.41
40	68	32	20	0.31
45	62½	37½	15	0.39
50	53	47	33	0.33

In the above table the first column gives the ages, the second gives the per cent. of eyes in which there was no latent hyperopia, the third column the percentage of cases in which a portion of the hyperopia was latent, the fourth column the average per cent. of the total hyperopia that was latent, in those cases in which any latent hyperopia existed; and the fifth column the average amount in dioptres of the latent hyperopia among those cases in which any portion of this hyperopia was latent.

Before discussing the rather startling facts that this table reveals let us consider for a moment its relations to any similar investigation by other observers. So far as I know the observations most nearly comparable to these are those recorded by Daniels of Berlin (*Centrdlblatt fur Prak. Augenheilkunde*, July-August 1883; and *Ophthalmic Review* Vol. ii, p. 300) based on the cases presented at Hirschberg's Clinic, measured ophthalmoscopically, most of them by Hirschberg himself. The points for comparison may be indicated by the following table:

TABLE II.

Age.	Proportion of the Total Hyperopia that is manifest. One-third.	One-half.	Two-thirds to three-fourths.	All.
10 or under	85	10	5	
11 to 15	78	18	4	
16 to 20		76		24
21 to 25		68		32
26 to 30		14	62	24
31 to 35		11	63	26
36 to 40			28	72
41 to 45			13	87
46 to 50			5	95
Above 50				100

In this table the first column gives ages: the second indicates the percentage of cases in which the manifest hyperopia was not more than one-third of the total hyperopia; the third column gives the percentage in which the manifest was one-half the total hyperopia; the fourth column, the percentage in which the manifest was from two-thirds to three-fourths of the total; and the last column the percentage in which all the hyperopia was manifest.

Donders (Accommodation and Refraction, p. 239) thought that at twenty years about one-half the total hyperopia was manifest, at forty, more than three-fourths, and at fifty-five, latent hyperopia had ceased to exist. It is interesting to compare these earlier statements with the figures given in columns two, three, and four of table I. The discrepancy between them is startling, and in view of the high scientific attainments of the other observers demands explanation. The data upon which Donders founded his opinion are not given. The basis of Daniels' paper was a comparison of the hyperopia estimated by the direct ophthalmoscopic examination, which was assumed to be the total hyperopia, with the amount of manifest hyperopia estimated in the ordinary way. In view of my own experience I can only conclude that very inadequate means were taken to get the maximum of manifest hyperopia or that the estimates with the direct ophthalmoscopic examination were quite inaccurate, or that the cases examined were radically different from those we meet in Philadelphia. My own statistics are based on carefully ascertaining the amount of manifest hyperopia by repeated trials under the most favorable conditions, by the use of test-lenses and test-type at the range of four or six metres, taking the strongest convex lens that allowed the best distant vision as the measure of the manifest hyperopia. And taking the correcting lens as chosen under full mydriasis, and confirmed by the shadow-test and the direct ophthalmoscopic examination, as the measure of the total hyperopia.

A word as to the method of obtaining the maximum of manifest hyperopia. My method is to make the test after the approximate amount has been ascertained by the direct ophthalmoscopic examination. The eyes after being allowed a moment's rest have placed before them convex lenses strong enough to certainly over-correct the hyperopia. After find-

ing the extent to which these lenses blur the vision, their strength is gradually reduced by changing them, or placing before them weak concave lenses, until the change no longer improves the vision. Then a card is held first excluding one eye, then the other, to ascertain if both see equally well, and if one eye shows a distinct inferiority to the other the lens before it is still farther reduced until it equals the other in vision, or ceases to be improved by the change. The essential points in such a test are that the lens should over-correct the hyperopia and that all changes should be made without allowing the patient to look without his lenses, and that the two eyes shall be used and tested together. Sometimes I have been able to increase the amount of manifest H. by having the patient read small print through the lenses for a few minutes and then look up at the test card, a trick I learned from my friend Dr. Chas. H. Thomas; and at other times I have gained a very little by placing before the eye an abducting prism, but these are of minor importance.

I am well aware that obtained in this way the manifest H. was distinctly higher, often very much higher, than could be discovered by testing each eye alone, or by commencing with weak convex lenses and increasing their strength gradually until the increase caused a perceptible blurring, and that to a corresponding extent the H. remaining latent was diminished. But I submit that it is this higher amount that we ought to regard as the real manifest hyperopia—the highest amount that under ordinary conditions of distant vision the ciliary muscle could be induced to leave to the lenses for correction. It is only what remains after this has been taken from the total that really corresponds to our conception of latent hyperopia.

Again, it is the case that the lens which I took as the measure of the manifest H. was often such only for a brief period, and worn for a few minutes would cause a marked blurring of vision. I had intended illustrating this by one or more cases but I find that Donders in the very process of explaining hyperopia gives such a beautiful illustration of this, that I quote it instead. He says:[1] "In my first investigations of H. I encountered the difficulty of accurately determining the degree of this anomaly. Thus an eye sometimes at first refused every glass stronger than $\frac{1}{12}$, while it soon afterward gave the preference to $\frac{1}{9}$, and subsequently again chose $\frac{1}{10}$, or $\frac{1}{11}$." In this, which being put as a suppositious case it is fair to take as representative of Donders' experience, there is revealed what Donders according to other passages seems not to have fully appreciated, the extremely variable, inconstant character of the latency of hyperopia.

At one time I fully believed, as it is fair to understand that Donders believed, and as Daniels' statistics clearly indicate, that latency of a portion of the hyperopia was the rule, and its absence the exception, and in childhood and early life the rare exception. The accumulation of the statistics upon which this paper is based have slowly undermined this belief and their tabulation has swept it away altogether. Unless the experience here recorded is entirely exceptional, and it agrees so well with other observed facts that this is improbable, latent hyperopia must be regarded as exceptional among patients as they come to consult us. Whether or not it is more common among these hyperopes who do not so suffer from eye-strain, and therefore are not found among our patients is a matter worthy of careful investigation. But among patients, it is but little if any more frequent, in proportion to the total number of cases than is spasmodic myopia. Is it not rational to suppose that like the latter condition, it is often or largely due to a condition of irritation, or undue irritability rather than a normal tonic state, like that of the sphincters or the vaso-constrictor fibres?

I confess I have never been able to quite accept the idea of a muscular tonic contraction that should be normal in one eye, usual in hyperopic eyes, and quite abnormal and unusual in eyes that have a slightly longer antero-posterior diameter.

Turning now to the matter presented in table I, it is to be noticed that the figures in the first and second column indicating the relative frequency of latent hyperopia are directly opposed to what has been usually held and taught. It is shown that latent hyperopia is least frequent, 21 per cent., before the age of twenty; and most frequent, 47 per cent., between forty-five and fifty, a period at which, according to Daniels, it is almost always absent. It may be well to mention here that although no case of hyperopia latent after the age of fifty occurred during the time covered by these statistics, I have seen a few such cases. One of them was that of a man aged 51 with a total H. of 2.50 D., of which 2. D. was latent. That latency of hyperopia should become less common as the range amplitude of the accommodation diminishes, seems at first glance probable, but a little consideration will show that the reasoning that indicates this is superficial.

Latency of hyperopia depends on the power and activity of the ciliary muscle, and up to middle life these are not diminished. Removal of the punctum proximum depends on increasing rigidity of the lens, the effect of which is to lessen the extreme change of form that the contraction of the ciliary muscle is able to effect in it.

By the figures of the fourth column it is indicated that in those eyes that have latent hyperopia the proportion of the hyperopia thus masked, while varying widely in individual cases (from 5 per cent. to 100 per cent.), is not at all proportioned to the age of the patient, being about equally high before the age of fifteen and after forty-five. While this is true as to the proportion of the hyperopia that is latent, there is, as shown in the last column, some diminution in the amount of latent H. as measured in dioptres; indicating that as age advances, the cases of high hyperopia all become manifest, leaving only the lower degrees that remain partly latent.

Briefly to summarize, the facts to which this paper is designed to direct attention are these:

That the latency of hyperopia is essentially exceptional, inconstant, and abnormal.

That it is not more frequent or proportionately greater in childhood, or in early adult than in middle life.

That the amount of manifest hyperopia discovered depends largely on the method of testing for it.

And from these follow certain practical deductions, viz.:

It would usually be unnecessary to employ a mydriatic to render manifest the total hyperopia, if we only had some certain means of detecting the exceptional cases in which it is necessary.

[1] Loc. cit.

V. 18

A mydriatic is as frequently needed, and as strong a mydriatic is needed to render manifest the total hyperopia at forty-five as at fifteen.

In correcting hyperopia without the use of a mydriatic the assumption should be that the total hyperopia is manifest. To add something for assumed latent hyperopia will, in the majority of cases entail imperfect distant vision, which will continue as long as the lens thus ordered is worn.

In prescribing a lens correcting less than the total hyperopia, in allowing for latency of a part of the hyperopia, we are allowing for an inconstant, temporary, mainly abnormal condition, and should warn the patient of the probable early need for a change of lenses, and that the best and most permanent relief is not to be expected until such change is made.

Discussion.

Dr. Charles Hermon Thomas:—I agree very thoroughly with what Dr. Jackson has said in his paper. I almost regret that he has failed to repeat some things that he has said elsewhere in regard to the allowance for range, *i. e.*, the distance from the test letters at which measurement is made under a mydriatic. I formerly found many cases in which I believed there was latency before the mydriatic was used, or in which there was recurring spasm after the mydriatic, but since I have come to make the allowance of .25 D. for 4 meters in length, or approximately that, I have found very few such cases. In my experience latent hyperopia is scarcely more frequent than pseudo-myopia from spasm. I believe that with allowance made for range as Dr. Jackson has heretofore pointed out, we shall find few cases in which there is after-spasm of the accommodation.

Dr. H. V. Würdemann, Milwaukee:—As a rule I use homatropin in refractive work, and think that these cases of latent hyperopia are about as frequent as the cases occur in which homatropin does not reveal the total error—*i. e.*, about one in twenty. In these cases we are forced to resort to atropin. I usually give the full correction as brought out by homatropin, except in highly hyperopic cases.

Dr. F. C. Hotz, Chicago:—I wish to refer to two points in Dr. Jackson's paper. I was surprised that he found so small a percentage of latent hypermetropia in people up to 30 or 35 years. I was also surprised that the amount did not exceed .75 D. It is true that by letting people wear glasses which correct the manifest hypermetropia, often a part of the hypermetropia that we regard as latent, becomes manifest. But my experience is that wherever we find manifest hypermetropia of a certain degree, and correct that, suspension of accommodation always reveals an additional degree of hypermetropia, showing that there is a certain amount always kept latent in young persons.

In regard to the degree, I am sure that in cases of convergent strabismus, there is certainly always a higher degree of latent hypermetropia than .75 D.

The manifest hypermetropia often shows only 1. D. or 1.5 D., when the total is 3. D. or 4. D. In these two points my experience does not agree with the observations presented in the paper.

Dr. Jas. A. Lydston said: In response to Dr. Jackson's statements to the effect that latent hypermetropia is the exception and not the rule, in our cases of refractive error, it seems to me that we must appreciate fully what that term latent hyperopia implies, and this is to be determined by our particular methods of testing. For example, if we resort to the ophthalmoscope we must fully concur with the doctor when he says "latent hyperopia is the exception and not the rule"—but if we resort to the ordinary methods of testing, without paralysis of the accommodation, then I am convinced by all the cases that have fallen under my observation, and by the experience of all ophthalmologists, that a certain amount of the hyperopia present will be held in abeyance, and constitute the so-called latent hyperopia. Again, when testing our cases and tabulating our statistics it seems that we are prone to forget that the individual may be suffering with a debilitated condition of the system which reacts upon the accommodative mechanism, and thus reveals an error which would otherwise be obscured and thus constitute a latent error, and in this case be styled latent hyperopia. Then too, when the doctor states that the accommodative mechanism is not materially impaired till later life, it appears that his experience does not concur wholly in this respect with that of others. Moyer, basing his statements upon the admirable table of Donders, states that the accommodative power begins to wane as early as 16 years, and is quite noticeably impaired at the age of 30, still more so at 50 years, and is almost obliterated at 75 years. So that this would exercise an influence directly opposite to that claimed by the doctor, in rendering manifest otherwise latent cases of hyperopia.

Dr. B. Alexander Randall, Philadelphia:—There is one small point that is worthy of consideration. As every one is well aware, in standing there is tension of all the muscles concerned in maintaining the upright position, but we do not call that spasm. So in viewing distant objects in hypermetropia, there must always be a certain amount of accommodative effort, which need not be spasmodic but can be relaxed as soon as the need for it passes away. To call every accomodative action of this sort a spasm is a mistake unless it is spasmodically exercised. It is within the control of the individual in part, but is largely an automatic coördinative adjustment.

Dr. Edward Jackson, Philadelphia:—I perhaps did not make prominent enough the influence of different methods of testing. Take for example a case which I saw within a few weeks. There was total hyperopia of 3.5 D. and I could get 3.25 D. of manifest hyperopia. That was by the method which I have used as the basis of this paper. If I tested each eye separately, I could not get full vision with anything over 2. D. convex. The method of testing is essential in unmasking the hyperopia.

I can fully appreciate the surprise of Dr. Hotz, for no one could have been more surprised than I was myself when I found these facts. I fully believed when I commenced this investigation, that the facts would be such as are implied by Donder's remarks, and that up to 20 years of age one half or two-thirds of the hyperopia in almost all cases would be found to be latent. I was surprised to find that in such a large proportion, three-fourths of all patients up to twenty years of age, all the hyperopia could be rendered manifest.

THE FOURTH DEGREE PRISM IN THE CORRECTION OF HYPERPHORIA.

Read in the Section of Ophthalmology at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June 1892.

BY A. E. PRINCE, M.D.,
OF SPRINGFIELD, ILL.

Mr. President and Gentlemen:—My excuse for the presentation of a paper on the fourth degree prism in the correction of hyperphoria, is based on the belief that ophthalmologists as a body are not analyzing these cases with a view to correcting so small an amount of error.

I shall waste none of your valuable time by reference to the differences of opinion which prevail regarding heterophoria in general, but will proceed directly to give the results of my experience with the correction of hyperphoria of low degrees.

It has doubtless been the lot of every member of this Section to meet cases of asthenopia so nearly approximating emmetropia, and having so little apparent disturbance of muscular equilibrium, that it seemed impossible to account for the symptoms, and they have continued to suffer uncorrected.

These cases were made much less frequent by the valuable contribution of Dr. Chisholm on "The Value of the .25 D. cylinder," read before this Section in 1889, at Newport, for previous to that time, astigmatism of smaller degree than .50 D. was relatively seldom corrected.

In still further reducing this class of unrelieved asthenopias, the profession owes its profound thanks to Dr. Stevens, for, whether or not we accept all that he has taught, we must acknowledge that he has given us a nomenclature, instruments and a method

of study in muscular dynamics which every student and operator to-day turns to valuable account.

Still a certain number of cases have refused to yield,and have continued to visit persecution upon us by returning again and again, having failed to get relief, whatever prescription may have been made.

Not having a prism in my trial case weaker than one degree, nor an instrument of greater precision than Steven's first phorometer, it was for me, impossible accurately, to measure errors of less than one degree, hence this remained the unit until the publication of the "Maddox Rod Test."

The use of this instrument rendered it apparent that degrees of hyperphoria, varying from one-eighth degree to one-half degree, were many fold more common than all the grosser errors combined, just as an astigmatism of .25 D. is found to exist more frequently than any other degree.

The first practical result, so far as my practice was concerned, occurred in the following case:

Miss L. B., æt. 21, had previously been under my observation during two periods of several weeks each, and had suffered with the following symptoms:

For about five years has seldom passed a day without an aching in and back of the eyes. About 2 P.M. a tired feeling would commence, and grow worse during the remainder of the day. There would often be a neuralgic pain in the right side of the head, which would persist until relieved by sleep. She could not read for five minutes with freedom from discomfort.

An analysis of her refraction revealed less than .25 D. of either spherical or cylindrical error. On one occasion I prescribed plus .50 S., and on another, an orthoscopic combination of Brudenel Carter, consisting of plus 1.25 S. with three degrees prism, base inward, which I formerly used a great deal. This latter glass relieving proportionately both recti and ciliary muscles, gave her considerable comfort. and enabled her to do a moderate amount of work, but even this, after a time, was no longer helpful, and her asthenopia and suffering from headache increased.

Again I tested her adduction, abduction, and right and left sursumduction, but discovered nothing. Again I went over her refraction under complete mydriasis with the same result. Upon the application of the rod test, it was observed that she had so slight a degree of hyperphoria that it was reversed by a prism of one degree. As this error seemed to be constant, I ordered a prism of one-half degree which was subsequently replaced by two of one-fourth degree each, base downward before the left eye, and upward before the right.

The first evening after commencing to use the glass she could read without discomfort, and has continued free from headache or discomfort from that day to this.

Some months since, in talking with one of the prominent advocates of graduated tenotomy, I was assured that the probabilities were large that a much greater degree of hyperphoria would be found to exist if the patient were retested after this length of time. Accordingly the patient was summoned, and an examination made to ascertain, if possible, whether or not the relief came from partial correction of a much larger error. Upon this examination, to which I brought the aid of the Steven's improved phorometer, I found an apparent one degree, which increase I had her wear for twenty-four hours, but the original prescription was preferred.

After witnessing the benefit derived from the fourth degree prism in this case, I ordered trial prisms of half and quarter degrees, and thereafter submitted all doubtful cases to analysis, relative to ascertaining the presence of the smallest amount of hyperphoria detected by the rod test. While a quarter to a half degree was found in a large proportion of eyes, and often one, two and sometimes three degrees were observed with no asthenopia, or other reflex symptoms, still a sufficiently large number of cases were met in which the various local and reflex disturbances were traceable to, and relieved by the fourth degree correction, that I felt encouraged in pursuing the inquiry, and now regard no examination complete which is conducted with less precision.

I have not prepared a statistical collection of facts, and results of the multitude of tests made for adduction, abduction and right and left sursumduction,remote and in accommodation, but have chosen, to serve my purpose, brief extracts of a dozen cases selected to illustrate some of the various phases of discomfort, in which relief has been found to result from the use of the fourth degree prism, in most of which all previous remedies had failed.

Case 2.— Illustrating emmetropia with one-fourth degree left hyperphoria. Miss Mary L. æt. 24, commenced eight years ago to complain of photophobia and incapacity to use the eyes at night. One of the early symptoms was a tendency to squint the eyes, and scowl in reading. She never experienced very much pain in the eyes and only occasionally suffered from headaches, and then not very much. Both in reading and writing, the letters would seem to dance,and the lines would seem to wave. This latter symptom was relieved by a colored glass, which was worn for a year, after which study was more or less discontinued, and the colored glass was worn occasionally. Five years ago I was consulted and failed to find any error whatever, but gave her a plus .50 D. S. with the hope that the diminished strain on her accommodation might give the eyes some comfort. These glasses were worn for reading only, and helped some, but, notwithstanding, the main symptoms have continued, and she has never been able to read at night, or do any work continously without discomfort. After attempting to use the eyes a burning sensation is experienced the following morning. After looking at anything intently for a short time the eyes feel as though they had been wrenched, the left eye particularly.

She consulted me again on March 29, 1892, but repeated examination failed to discover any refraction error.

One-half degree of left hyperphoria was discovered, and a prism given for its correction. This was worn in the trial frames for two hours with perfect ease, and she expressed a feeling of rest which had not been experienced either with or without glasses for several years. One-fourth degree in permanent frames was ordered before each eye, and she was requested to report in a month.

Before that time she returned, saying that the permanent glass had not been so restful as the trial glass had seemed to be, and on examination it was found that the hyperphoria was scarcely one-half degree, hence slightly over-corrected. One fourth degree was put in trial frames, and she was induced to remain a few days, during which perfect comfort was experienced. The correction was made permanent, and was found after one month to be satisfactory.

This case is one of several in which the discomfort was relieved by a fourth degree prism to one eye only.

Case 3.—Illustrating plus .50 C. 90° one-fourth degree right hyperphoria.

Miss Ida S., æt. 19, consulted me from Lincoln, Ill., where she was attending school. She complained as follows:

For several years she had been obliged to save her eyes, and experienced photophobia and pain on using them. She was unable to study more than twenty minutes, and was afraid she would be obliged to give up her school. A burning and smarting of the lids was experienced on application for even a brief period of time.

Upon examination, under complete mydriasis, plus .50 C., axis 90 degrees was found and prescribed. Upon first examination no heterophoria was discovered. The glasses were comfortable, yet she could not endure continuous work. After three months of rest she was no better. A second time she consulted me, and upon examination I found one-fourth degree of left hyperphoria. It was also found that she was quite sensitive to the reversal of the prism. It was ordered in a light trial frame, to be worn over her cylindrical correction long enough to demonstrate its efficiency.

After two weeks she reported that the strain seemed relieved, and she could do a large amount of work while wearing the trial glass, but when it was left off, she could use the eyes but a few minutes.

Case 4.— Illustrating recurrent conjunctival hyperæmia.

Miss Maude T., Springfield, Ill., æt. 18. While in school in the winter of 1883, the eyes became inflamed and red, and her family physician prescribed for her. The eyes were bandaged, and she was confined in a dark room for about four days. Improvement followed, and she was able to resume her school work for the remainder of the year, but the eyes did not become quite comfortable. During the following vacation the eyes were not in use for the purposes of studying, but still there was no time when she became quite unconscious of having eyes. From this time until the winter of 1887 she had no especial difficulty.

In the winter of 1887 she began to suffer from weakness and was taken out of school, and did not resume her studies for the rest of the year. In 1888 she had no especial difficulty, and finished her school year.

In 1889 she began to have trouble in March, and was treated by her family physician for granulated lids, which recovered in a large measure in the course of a few months, but school was not resumed until the following fall.

During the winter of 1890-91 she did some studying at home, and experienced no trouble with the eyes; was fairly comfortable up to February, 1892. At this time the eyes broke down, and she again consulted her family physician, by whom she was treated for inflammation until March 1.

In all of these attacks the trouble with the eyes was preceded by headaches which "seemed to extend to the eyes."

On consulting me she complained of burning of the eyes, and a feeling as though the eyes had been wrenched. Pain back in the sockets was experienced on extreme lateral movement.

Examination revealed an astigmatism of .25 D. and hyperphoria one-half degree. The astigmatism was ignored for a time, and trial frames were worn for a week continuously with one-fourth degree prism, base upward, before the left eye, and downward before the right. Absolute comfort was experienced, and a glass was ordered in which the cylindrical error was incorporated.

At the end of a week all inflammation and soreness in the muscles had disappeared, and she could resume her studies with comfort.

A permanent glass was given, and she reported a month later, "Eyes absolutely restful."

Case 5.— Illustrating rapid nictitation. Kirk O., Petersburg, Ill., æt. 11. Called on me April 1, 1892, with a history for the past six months of holding his book very close to his eyes when reading, and of squinting at the same time so as to secure a very narrow palpebral aperture. In the evening he was subject to very rapid winking whenever looking at books or pictures, and would have periods of rubbing the eyes. Examined under homatropine, it was found that he was emmetropic. One-half degree of left hyperphoria was discovered, and a prism of one-fourth degree, base downward, before the left eye, base upward before the right, was prescribed and worn for five weeks, when I saw him for the second time. All symptoms of winking and squinting had disappeared. Since wearing the glasses the book is held at the usual range.

Case 6.—Illustrating asthenopia with astigmatism; hyperphoria one degree, and esophoria nine degrees.

(One of the most interesting cases is the following, on account of the combination with anisometropic-astigmatism and esophoria.)

Louis H. M., editor, æt. 32, asthenopic symptoms commenced about seven years ago, and he especially noticed a sensation which is described by the patient as "pulsation of the blood vessels of the lower lid," for which he sought relief in St. Louis. Glasses were prescribed to correct an error of refraction; not deriving comfort, he returned at intervals varying from one to two months, for nearly two years, during which the right glass was changed several times. He then sought relief in Chicago, where he made five trips extending over a period of four years, and at each visit received a different pair of glasses, and on the last, an additional glass for reading. No permanent comfort was obtained, and he was obliged to discontinue his editorial work, and almost all outside reading. Reading by artificial light was out of the question.

In November, 1891, he suffered from two superficial ulcers of the cornea, which yielded to treatment. A month later I was consulted for the first time, and found right eye minus 1.50 S., minus .75 C., axis 180°, left eye plus .25 S. minus .75 C., axis 180°; esophoria 6 degrees, hyperphoria 1 degree.

The sphero-cylinder was ordered, and the heterophoria ignored until April 4, 1892. During this period he had been able to use the eyes to a somewhat greater extent, but had never experienced a day of absolute comfort. On April 4, hyperphoria, one degree and esophoria nine degrees were found. In order to discriminate from which correction the greater relief was obtained, the esophoria was ignored, and half of the hyperphoria was corrected by one-half degree prism, base downward, before the left eye. On April 5 he reports that he does not remember a day in two years so nearly approximating absolute comfort.

April 6.—The remainder of the hyperphoria was corrected by a one-half degree prism before the right eye.

April 7.—Not so comfortable.

April 8.—Still not so comfortable; return to one-fourth degree in each eye, which, after a week of comfort, was incorporated with his sphero-cylinder.

He was told that he still had a high degree of esophoria, and might require a tenotomy or prism.

June 6.—Says, "I suffer from absolutely no discomfort; can now read ten or twelve columns of fine newspaper print, without realizing that I have used my eyes."

This case illustrates the relative effect and the importance of detection and correction of a small amount of hyperphoria, as compared with a large degree of esophoria.

Case 7.—Illustrating neurasthenia. Miss Nellie A., æt. 20, teacher.

Consulted me in January, 1891, with the following history. At about ten years of age she remembers being troubled with blurring, and was obliged to remain out of school a portion of the school year. She cannot remember when the light did not hurt her eyes.

At twelve years of age she found some relief from colored glasses, which were worn to and from school. From this time she had a feeling of weight pressing down, seemingly over the eyes, so that a great effort was required to look up. Together with this, she suffered from general physical exhaustion, and had a feeling as though she was straining every nerve in the effort to fix the gaze on objects. This was worse when fatigued, and particularly experienced in the afternoon of every day, and by night she was usually sick with headache.

In the morning after a good night's sleep she would feel comfortable for a variable time, depending on the use of her eyes. With increased application trouble would begin about the middle of the forenoon. She always felt better on cloudy days.

When looking at an object for some time, the eyes would assume a feeling as though they were fixed in a staring gaze, which feeling would continue though the eyes were directed towards various objects, and it was only an effort of the will that this unnatural feeling could be shaken off.

After reading, she would become very nervous, so that she could not write on account of trembling. In this condition she could not read two minutes.

She was often troubled with "twitching of the eyes." The muscles around the eye would jerk in a very amazing manner. A prominent symptom was that of dryness, provoking an inclination to rub the margins of the lids.

I found by an examination under mydriasis, emmetropia, right hyperphoria one-half degree, to the correction of which she was very sensitive. Prescribed R. E. one-fourth degree base downward, L. E. one-fourth degree, base upward.

The following letter was received after one week:

"I am very much pleased with my glasses; it will be no cross for me to wear them all the time, for they are so restful! I cannot bear to take them off. Those headaches have not troubled me, and I have not been so nervous. Everything looks very plain, and it is such a relief not to have to strain every nerve to see any object."

It is five months since commencing the use of the glasses, and she now tells me that she has not had a single headache except on one occasion when she broke the glass, and was without them four days.

The first day she noticed that she was much more tired than usual, but did not suffer from pain. On the second day, and until she received the glasses again, she suffered in the old manner, and to a similar degree.

While wearing the glasses there is no photophobia, but leaving them off will provoke photophobia and fatigue in from one to two hours. She regards the relief from the glasses as absolute.

Case 8.—Illustrating drowsiness. Mrs. C. F. D., æt. 29, Ashland, Ill.

She commenced having trouble five years ago, for which glasses were prescribed. They were worn three years, more or less.

During the last year and a half, they have not relieved her condition. She now consults me again on account of

pain over both eyes, extending into the temples. This pain is aggravated by looking down. Discomfort increases as the day advances, and is proportionate to the use of her eyes.

Occasionally the eyes burn, lasting for short periods of five to ten minutes. Complains of drowsiness coming on during the day at irregular intervals.

These spells are sometimes of short duration, but may continue all day. Almost invariably gets sleepy immediately after supper, and drops off to sleep unless compelled to remain up. Examination reveals one-half degree of left hyperphoria.

Independent of eye pain, has pain in back and back of head; cold feet and hands.

R. R. E. one-fourth degree, base up.

L. E. one-fourth degree, base down.

Relief was prompt, and she reported after one month that she could open her eyes wide, with no tendency to frown, and that the symptoms of drowsiness had disappeared.

Case 9.—Illustrating epiphora. Miss Lizzie L., æt. 14. Presented herself for examination Jan. 30, 1892. She complained that for about two years she has been troubled with excessive lachrymation, and almost constant burning of the eyes. Objects seemed to blur at times, but she has never been troubled with seeing double. She has suffered from frontal headaches for several years, which have recently been very bad. Upon examination it was found that she was emmetropic, and that she had left hyperphoria one-half degree and esophoria three degrees. She was especially sensitive to the prism which corrected her hyperphoria, and I concluded to ignore the esophoria and correct the hyperphoria by a prism one-fourth degree before each eye. She reports as follows, March 7, 1892: "I promised to let you know how my eyes were after wearing my glasses one month. I could not do without them now, they have done me so much good. I never have the headache as I used to, and I can read or sew all day without having to rest my eyes. I very seldom have to wipe them, and before, it was every five minutes."

Case 10.—Illustrating recurrent migraine of severe type. Mrs. T. S., Decatur, Ill.

Following measles five years ago, she complained of terrible headaches, associated with confusion of sight, which she called "blind headache." These headaches would yield to no treatment, but after several hours, she would drop to sleep and awaken refreshed. During the intervals which were from a week to ten days, she would not suffer from eye symptoms, and could do any kind of fancy work.

Having exhausted the patience and skill of her family physician, she was recommended to consult an oculist and ascertain if any possible trouble could be found in the eyes to account for the recurrence of the headaches. This was in November, 1891. It was found that she had minus .75 C. axis 0°, each eye, and one degree of right hyperphoria. Two prescriptions were made in order to ascertain which would be preferred; one of one-fourth degree each eye, and the other of one-half degree on cylinder of minus .75 C., axis 180 degrees. She reported that while the weaker glass was worn with comfort, she could not wear the stronger. She reported to me again June 4, 1892: "Since wearing my glasses, now eight months, I have never had a bad headache, and could not be induced to go without them."

Case 11 illustrates one of the worst types of migraine without eye symptom, but relieved by correction of hyperphoria and astigmatism. Joseph K., æt. 38, jeweler. For fifteen years has suffered with violent attacks of hemicrania, averaging once a week. There are no symptoms of eye strain. Reading does not provoke attacks, but they are precipitated by travel and sports. A day in St. Louis or Chicago, or fishing or hunting, is followed by an attack. These attacks last from sixteen to thirty-two hours, and during the severity the patient can neither sit nor lie, but must rest in a reclining position with eyes closed.

His family physician suggested an examination of the eyes, with the following result: R. E. plus .50 S. plus 50 C. 90°, ¼° hyperphoria; L. E. plus .50 S. plus .25 C. 90, ¼° cataphoria.

He was more sensitive to the hyperphoria than to the sphero-cylinder, and a glass was made correcting these elements.

He has worn the glass sixteen months with but six attacks, but one of which was as severe as those from which he formerly suffered.

Case 12.—Illustrating burning of the lids and headache. Miss Minnie B., Greenview, Ill., consulted me January 1, 1892, regarding a headache which originated in Germany three years ago, and which had persisted ever since, and resisted the action of medicine on numerous occasions when she sought treatment. Headache was mostly frontal, and accompanied by a burning sensation of the upper lids, and a tendency for the eyes to close. She would frequently have difficulty in opening the eyes and looking directly at objects, although she did not complain of diplopia.

The pain was at times worse in the morning, and at other times worse in the evening; nothing constant. Upon examination of her refraction, it was found that she had R. E. plus .25 C. 90 degrees, and L. E. minus .25 D. S. Right hyperphoria one-half degree, and esophoria four degrees. The prescription was made of one-fourth degree, base upward in the right eye, and downward in the left, upon which her correction was ground; esophoria ignored.

January 25. She reports to-day that she is greatly relieved; she has no more burning of the upper lids, and no more of the tendency of the eyes to close, and her headaches are greatly ameliorated. There is a slight discomfort at times which is scarcely worth mentioning.

The following matters of detail are urged, to secure the greatest possible degree of precision:

1. Secure a perfect Maddox rod test, which is thought to be superior to Stevens for these delicate measurements: first, because the images on the retina are entirely dissimilar and have no tendency to blend; second, from the fact that they can be superimposed, thus facilitating comparison, which is especially important in the detection of small degrees of error; third, because comparison is more readily made between the hyperphoria and equivalent corresponding cataphoria, thus eliminating errors of observation or statement.

From the fact that these rods are drawn, a certain portion of them are defective, being slightly conical, which can be detected by inverting the rod before the normal eye.

To increase the efficiency of the method, at my suggestion, F. A. Hardy & Co. have in process of manufacture a phorometer, the essential portion of which consists of two 2° prisms, which rotate in opposite directions over one another so as to present before the rod every fraction of a degree from 0, where they are neutralized, to six degrees, when they act together. An arc is graduated to one-eighth degree, so that the refraction can be accurately read off, as well as the nature of the error, whether it be esophoria, exophoria, or right or left hyperphoria.

2. Make the point of observation the smallest compatible gas jet. By doing this a narrower light streak is observed, which, when the rod is in the vertical position before the eye, should, in the absence of hyperphoria, exactly cut the flame.

3. Place the gas jet or taper before a dark background, which will increase the capacity of the patient to detect a small error. On several occasions hyperphoria has been overlooked, and other errors which were present corrected, later to find upon more careful observation with a reduced light and dark background, that one or two quarters were present, the correction of which gave complete relief.

4. Compare the hyperphoria with the corresponding cataphoria, to which it should be equivalent. In event of discrepancy in these cases, it has been found the best practice to correct the smallest degree in the trial frames, and test again to ascertain if more becomes manifest.

5. Following the suggestion of others, it is believed that a much larger percentage of satisfaction can be secured by being provided with a variety of light steel frames, with bridges of various heights and prominence, supplied with long screws to facilitate

changing of prisms, which should be worn for a time, either with or without such other correction as may be present, in order to ascertain whether the prism in question is acceptable to the patient. Each case is a law unto itself.

Some cases will be found in which the heterophoria is provisionally corrected with comfort to the patient, by the muscular adjustment, while in others an error of one-fourth degree will require a corresponding prism before relief will be obtained. In some cases the weight of the trial frame usually employed, is so great as to vitiate an observation, and lead the patient to pass judgment against the prism, which, had the light, well fitting frame been employed, would have been reversed.[1]

A word may not be amiss concerning the measurement of the weak prism, whereby the physician may be assured that his prescription had been filled by the optician. There are various methods known to the mathematical optician which are impracticable in the practice of the physician, who must, more than likely, rely on the method of neutralization. To this end, as well as in the original detection of the error, I have found the Maddox rod to serve best. Knowing the prismatic error possessed by one's self, and having corrected it, the rod causes the ray of light to appear to cut the flame seen by the fellow eye. The glass in question is now held before the eyes, when an appreciable vertical displacement will occur. The neutralizing glass is now placed before the glass to be tested when the equilibrium will be restored. This method is simple and can be operated by anyone having good binocular vision, and an approximation to orthophoria.

Dr. H. Gradle, Chicago:—The significance of any results diminish as they approach in numerical value the errors incident to the method employed. In criticising the results obtained with one-fourth degree prisms, I would only say that the least possible tilting of the spectacle frame from the vertical position will produce a difference greater than that mentioned. Most of us can recall occasional instances where patients were satisfied with certain weak glasses which on subsequent tests proved to be incorrect and sometimes almost the reverse of what was ordered, and still the patient was suited.

Dr. Samuel D. Risley, Philadelphia:—I should like to call attention to one error occasionally made in the construction of spectacles, although not a very frequent one. The optician will sometimes grind a compound lens upon a glass whose surfaces are not exactly parallel, so that the spherocylindrical lens will also be prismatic. I remember one case in which almost a 2° prism was thus produced by the carelessness of the optician.

Dr. Prince closing:—In answer to the hypothetical objection that many glasses are worn with comfort which from fault of lenses or frames are decentered so as to effect a prismatic action greater than $\frac{1}{3}°$, it is sufficient to say that a great number of cases occur who are unable to work with freedom from strain after a spherical correction has been made, who are rendered comfortable by slightly decentering the lenses by readjusting the frames. The fact that the great majority of persons can wear badly fitting glasses does not militate against the claim that a few demand the absolute centering in the vertical meridian.

FACIAL EXPRESSIONS AS INFLUENCED BY THE OCULAR MUSCLES.

Read in the Section of Ophthalmology at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY GEORGE T. STEVENS, M.D.,

OF NEW YORK.

In the course of some years of close observation of the anomalies of the muscles which govern the movements of the eyes, the fact that remarkable changes often follow the modification of these muscles led me not only to regard with greater care these facial changes, but to bring to the subject the aid of photography. Photographic portraits of more than two thousand persons have been taken, the records of whose ocular-muscle conditions have been carefully and repeatedly made.

We have thus for the first time a series of observations in which the facial expressions are registered by photography while pains-taking determinations of the ocular-muscle conditions are faithfully recorded. The result of the study has been to demonstrate that certain well defined types of facial expression are not only associated with but are dependent upon certain relative tensions of the oculo-motor muscles. With the state of equilibrium of the eye muscles, orthophoria, the expression is one of greater repose that with any of the states of heterophoria. The eye brows form each a moderate and regular curve, marking the border of the orbit, the lower border of the brow corresponding to the orbital border.

The inner extremity descends towards the nose, but does not turn downward into the depression bounded by the nose and orbit. There is no sharp turn or curve at either extremity. The mouth is nearly horizontal or curving very slightly upwards at the centre. The lips in repose are firm but not compressed, and the upper one is well proportioned. The chin is rounded, neither square nor pointedly oval. The lines of the forehead are not especially conspicuous. The facial lines are moderately spreading.

With esophoria the brows are compressed, the extremities often curve suddenly downwards, the inner extremity sinking into the depression bounded by the nose and orbital border. The palpebral fissure is usually less widely open than in orthophoria or exophoria. The lips are firm, the upper one short. The posterior portion of the alæ of the nose drawn slightly upward, the superficial lines or grooves upward from nose erect and distinct; especially in middle life and later; transverse lines upon the forehead low; the naso-labial and cantho-malar grooves spreading. The lower part of the face is broad.

With exophoria the brows are usually raised, often strongly arched; palpebral fissure often wide; upper lid rather conspicuous; upper lip long; corners of the mouth often drawn up and the mouth curving down at the centre; lower part of the face usually narrow; principal grooves of the face more vertical than with esophoria. The transverse lines on the forehead are mostly above the centre. Hyperphoria is characterized by irregular features. On the side, the visual line of which tends to rise above the other, the brow is depressed, while the brow of the side whose visual line tends downward is elevated. Thus the brow and neighboring tissues of one side aid in depressing the front of the eye, while, on the other hand, by the elevation of the opposite brow less demand is made upon the muscle which rotates that eye upward. These contrary actions demanded by the relations of the visual lines in hyperphoria affect the whole face resulting in a want of harmony of the two sides. The angle of the mouth, on the side on which the brow is depressed, is drawn upward, while the other angle is depressed. Thus one side of the face appears longer than the other.

[1] Sets of a dozen frames with assorted bridges, and a series of prisms to fit, are furnished by F. A. Hardy & Co.

There are a number of sub-types depending on hyperesophoria and hyperexophoria. While there are apparent exceptions to these rules, as to most rules, and while the bony structure must give to the face its general form, the law is very generally prevalent.

The recognition of these types of expression is useful to the oculist as well as to the artist. Any one of the types may be modified or transformed to another type by modifications of the relative tensions of the muscles which rotate the eyes.

THE TREATMENT OF INCIPIENT CATARACT.

Read in the Section of Ophthalmology, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY A. J. ERWIN, M.D.,
OF MANSFIELD, OHIO.

The surgery mania is so prevalent in our profession that the suggestion of other therapeutic agents is not always tolerated; especially is this true of cataract. In fact, the modern therapeutics of cataract is excessively surgical. Noyes admits that cataract has been cured by medicinal agents, but it seems to him so questionable that he has not even formulated a treatment for it. While Edward Meyer "believes that the recorded cases of recovery from cataract by medication may be attributed to error of diagnosis." (Sic.) Such being the teaching of modern authors, it is not probable that many oculists have undertaken a persistent systematic treatment of incipient cataract. No one, I apprehend, will deny my contention that an incipient cataract, while the eye has an acuity of vision equal to the average aphakous eye should be stopped, if possible, even though there should not be any improvement of sight, but it is not necessary to argue this point before an audience of specialists, you all understand it; I shall, therefore, not delay in bringing before you the point at issue, viz., can the progress of incipient cataract be arrested? In answer to this question, I beg to present to you the history of a few cases of incipient cataract taken from the records of my own clinic, viz.:

Case 1.—Mrs. J. R. Richardson, æt. 50, Mansfield, Ohio. February 11, 1886. Incipient cataract, O. D. V=20-100. O. S. V.=20-100. Treatment, galvanism and tincture of iodine about the eyes three times per week, with iron tonics daily. When discharged after two months treatment examination showed O. D. V=20-40, O. S. V=20-40, which continues the same to this date (August 18, 1892).

Case 2.—John Hull, æt. 82; Mansfield, Ohio. June 12, 1886. Incipient cataract, O. D. V=20-200. O. S. V=20-100. Treatment galvanism and tincture of iodine about the eyes, three to six times per week, with elix. calisaya, iron and strychnia three times daily. When discharged after five weeks' treatment, he had O. D. V.=20-100, O. S. V.=20-50, which was maintained until about Jan. 1, 1889. He returned for treatment Aug. 31, 1889, with O. D. V.=light perception, O. S. V. =12-100. His former treatment was exactly repeated for six weeks; when discharged he had O. D. V.=not improved, A. S. V. =12-50, which continued as at date of discharge until his death, two and a half years later.

Case 3.—Mrs. E. Chandler, æt. 65; Mansfield, Ohio, Oct. 9, 1888. Incipient cataract O. D. V.=fingers one foot, O. S. V.= 20-60. Treatment externally, galvanism and tincture of iodine daily, citrate of iron, quinine, pepsin and bismuth with each meal. When discharged after two months' treatment she had O. D. same, O. S. V.=20-40. Six months later O. D. matured, but to this date O. S. maintains vision 20-40.

Case 4.—Israel Swineford, æt. 70, Pavonia, Ohio. May 4, 1889. Incipient cataract, O. D. V.=10-100, O. S. V.=5-200. Did not take treatment until July 23, 1889, at which time he had A. D. V.=5-100, O. S. V.=2-200, Treatment, elix. calisaya, iron and strychnine, with each meal, one drachm. With galvanism and tincture of iodine about the eyes three times per week. Dismissed after six weeks' treatment with vision O. D. =13-100, O. S. =2-200. July 4, 1891, no change. I have not seen Mr. Swineford since. (He had the grip a year since, and has now O. D. V. = 3-100, O. S. V. = 2-200, August, 1892.)

Case 5.—Mrs. John Hull, æt. 80; Mansfield, Ohio, Aug. 31, 1889. Incipient cataract O. D. V. = 12-100, O. S. = 2-100. Treatment, galvanism and tincture of iodine about the eyes, with iron and quinine tonics with each meal. The applications were made from three to six times per week from Aug. 31 to Oct. 31, by which time O. D. had improved to 12-50, O. S. remaining at 2-100. There has not been any change in the acuity of her vision since.

Case 6.—Mrs. Jacob Schall, æt. 65, Mansfield, Ohio, Oct. 17, 1889. Incipient cataract O. D. V. = 20-40, O. S. V. = 20-40. Treatment, galvanism and tincture of iodine, with elix. calisaya, iron and strychnine. Dismissed Nov. 25 with O. D. V. = 20-30, O. S. V. = 20-30. No change in the amount of vision to this date.

Case 7.—Mrs. F. E. Cope, æt. 70. Mansfield, Ohio, Nov. 25, 1889. Incipient cataract and retinitis albuminurica, with general dropsy. O. D. V. = 20-100, O. S. = 15-100. Treatment, tincture Ferri chlor. and quinine, and later galvanism and tincture iodine over eye lids. Dismissed Jan. 14, 1890, with visual acuity O. D. = 20-50, O. S. = 20-70. Albumen and dropsy had entirely disappeared. No increase of of cataract to this date.

Case 8.—Mrs. Henderson Richey, æt. 75, Mansfield, Ohio, Dec. 26, 1889. Incipient cataract O. D. = 4-200, O. S. V. = 20-100. Treatment, galvanism and tinct. of iodine over eyelids, with elix. colisaya, iron and strych., daily. Dismissed Feb. 25, 1890, with vision O. D.=6-200. O. S. 20-50.

July 1, 1890, O. D. fingers at one foot, O. S. = 20-40. July 1, 1891, I extracted R.= cateract at her demand against my judgment, O. S. being so good. Sept. 15, 1891 O. D. V. = 20-30 O. S. V. = 20-40. Corrected, but unable to wear cataract glass on account of the confusion it caused as usual. O. S. cataract has not made any advance since.

Case 9.—Catharine Orwiler, æt. 68, New Washington, O., April 19, 1890. Incipient cataract, O. D. V. = 20-50. O. S. V. = 10-100. Treatment, galvanism and tinct. iodine over eyelids daily, and citrate of iron and quinine. Discharged June 21, 1890. Vision O. D. = 20-30, O. S. = 20-100. I have not seen this woman since, but I am informed that her sight is still about as good as when discharged.

Case 10.—Mrs. Susan Law, æt. 80, Mansfield, O. May 2, 1890. Incipient cataract, O. D. V. = 10-100, O. S. V. = 1-200. Treatment, elix. calisaya, iron and strych., with the usual application of galvanism and tinct. iodine. Discharged May 24, 1890, with vision O. D. 20-100, O. S. not improved.

July 9, 1891, O. D. V. = 20-100. O. S. cataract mature V = perception of light.

Case 11.—Mrs. S. B. Markel, æt. 50, Ashland, O., Nov. 18, 1890. O. D. posterior capsular cataract with fluid vitreous, vision = light perception. O. S. incipient lenticular cataract, vision = 20-70. Treatment daily for five weeks with the galvanism and tincture of iodine and iron tonics. Vision at discharge and to this date O. D. not improved, O. S. 20-40.

Case 12.—John Bergderfer, æt. 67, Catawba Island, O., Dec. 15, 1890. O. D. hypermature cataract with fluid vitreous and perception of light. O. S. V. = 20-100. Incipient cataract following six months after a stroke on the eye. Treatment citrate of iron and quinine with pepsin and bismuth, and the usual application daily of galvanism and tincture of iodine. Discharged after five weeks treatment with vision O. S. 20-100. No relapse to this date.

During the past year I have treated four other cases of incipient cataract in the same way, with about the same results, but they are not described in detail because of the recent date of their treatment. My experience convinces me that in nearly every case of incipient cataract we can save to our patients for a few years at least, their existing amount of vision, which in many cases may be even more serviceable than that of an aphakous eye.

CAMPHOR.—Dr. Karl Rosaer, in *Zeitschrift f. Therapie*, recommends liquid parafine as a solvent for camphor for subcutaneous injection; on warming, a clear solution is obtained which will keep a long time.

THE NEGLECT OF MEDICAL EDUCATION IN THE UNIVERSITIES.

BY BAYARD HOLMES, B.S., M.D.,
PROFESSOR OF SURGICAL PATHOLOGY AND BACTERIOLOGY IN THE COLLEGE OF PHYSICIANS AND SURGEONS.

It is now the fashion for every medical college to have a "University connection." This is a condition, often, as we have reason to know, of the most distant and unstable character. In some cases it means that the medical school is advertised in the announcement of the university and helps to swell the number of university matriculates, but that it is autocratic and independent of the university in all its acts and the university is free from all financial responsibilty in the medical school. In other cases it means that the university is responsible for the housing of the medical department which it has farmed out to a few physicians. These men conduct the affairs of the institution as they see fit and, we regret to say, without regard to the interests of any but themselves. Some of these university medical schools still have seven or eight professors as they did fifteen years ago. The increase in medical lore and the improvement in methods of medical investigation have made no additions to their curriculum or to their faculty.

But it is not of the private universities that the profession has a right to complain. Under our existing laws and customs, what they have is theirs to do with as they please. With the State Universities it is different. They are the proper subjects of criticism. They have entered the field of medical education to teach and not to bolster up the acquaintance and reputation of any set of men. The State medical schools should then require of their students the very best preliminary education, the most extensive course of study, and the most rigid examination and clinical demonstration of fitness for graduation. It is notorious that the State University medical schools in order to encourage scholarship (?) ask no tuition fees, and yet it is equally notorious that students are not excluded from these schools for illiteracy. Therefore the "medics" in the large State universities are the most uncultured and uninfluential of the lot of students. Medicine is disgraced by the boisterous crowd, and anything like adequate teaching of such students is impossible. The course of study in those schools is not more extensive than in the best private schools. In no sense do they lead in education. Their degrading effect on medical education would be greater but for the fact that most of them are situated in small cities, and therefore they are rarely rivals of metropolitan schools.

The position of the medical department in the American university is unique. Medicine is the natural recipient of a large portion of the men who take the bachelors' degree in science. Medicine should have a larger portion of the Bachelors of Science than the law has of the Bachelors of Arts. In looking over the class statistics in the college magazines that lay on our table, we find that between thirty and forty per cent. of the June graduates are put down as prospective lawyers; the balance of eighty per cent. as prospective preachers; while only five per cent. are reckoned as prospective doctors. In the Law departments of our universities over half the matriculates are graduates in the arts, while the most fortuitously situated medical schools can not boast of more than ten or fifteen per cent. of students who have the bachelors' degree.

Of all the occupations of life, medicine is the most benevolent. In this respect it should be a rival of the ministry. It is the one occupation in which there is a life long pursuit of science. In this respect it should compete with the mechanical arts and engineering. It is the one occupation in which a man is free from the crushing influences of our modern growth of monopolies, and it is the only profession in which a man may expect to earn a living from the beginning. In these respects it has no rival. It is astonishing then that medicine receives so small a proportion of our college educated men.

We cannot attribute this neglect of medicine to its comparatively small financial rewards, because these rewards come soon and last to the end of the doctor's life. We cannot attribute it to the hard work and long hours, because the other professions are hardly less exacting. It cannot be because a larger proportion of men love the study of the humanities and literature and a smaller number the sciences, because the former are notably artificial. But we believe the cause is to be sought in the general neglect of the sciences by the universities, and the special neglect of that fruition of the sciences, medical science. The professors in the most celebrated, and we believe the most overrated university medical school in the country, not only receive a smaller salary than any other professors in that renowned faculty, but less than many of its tutors. Again, the professorships in this institution seem to be under a protective entail limiting appointments to certain families. In other branches of the same university no such systematic favoritism is manifested. This medical school, though most fortuitously situated, and though holding a very high, if not the highest, place in the esteem of the profession, does not attract any considerable percentage from the enormous classes that yearly graduate from the arts and science departments of the same university. That is to say, this great medical school is not looked upon with favor by students of the university. The scientific spirit does not so pervade the institution that the rapidly increasing students are attracted to medicine as a field of mental activity.

Undergraduates are led to the selection of postgraduate fields of study by fashion, by the influence of the undergraduate professors, and by distinction already attained by former aspirants. If there is no place in a medical school open to ability, original research and honest and successful work, the ambitious and high-minded student will select a department in which birth and marriage play a smaller part in the bestowal of professorships and honors.

To the profession at large, this strange condition of affairs in so many of our medical colleges is not more ridiculous than it is exasperating.

Again, the too "practical" character of medical teaching drives away real students and scholars. While in other branches of the university a constant effort is made by means of lectures, theses and honors, to increase that indefinite educational element which has been termed culture, these efforts are not apparent in the medical school. The medical school seems to be given over to the sordid clinician and the chemist, to the humdrum lecturer and the ranting specialists. Real culture is the quality which our medical schools most need.

The students in this department are in most institutions under different rules and regulations, both

in regard to requirements and honors, from students even in the other professional schools.

It is unfortunate that we have so many medical schools, but more unfortunate that we have only one sort. The requirements of the oldest and we believe richest medical school in the United States now barely comes within the minimum requirements of the State Board of Health of Illinois, and not within the minimum of the Association of American Medical Colleges. The fees of this school also are as low as those of a provincial college.

The medical profession has abundant reason to complain of the stingy manner in which medical education has been conducted by the independent universities. It has still more reason to complain of the State universities. From these it ought to receive more. As long as the present industrial system prevails, the only hope is in the liberal endowment of one or two colleges. We have been waiting for Johns Hopkins for years. We have mourned the loss of a large slice of the endowment and the delay in utilizing the remainder. We have regretted the expenditure in monumental buildings of the resources which should have gone into endowment. But we still believe that the model college will be realized. We believe that the medical men of the country will advise their students to take the full science course, and then patronize the college that requires the most on entrance, and continues to require and give the most to the end of the course.

In conclusion, we would formulate the following propositions, which we believe can neither be denied nor refuted:

1. The universities, without exception, neglect their medical schools, farm them out or treat them on principles different from and inferior to those which are applied to their other departments.

2. The university medical schools compete with the poorest independent schools in their entrance examination, in their low fees, and in their short courses of study and low requirements, and thus do a great injustice to the reputation of medicine in the university.

3. The utilitarian atmosphere which pervades the medical departments of our universities, the nepotism by means of which the appointments in these schools are made, and the consequent poor pay which is given to the few teachers that are paid at all, turns away ambitious and highminded men from seeking a scholarly career in medicine.

4. In all of these directions, the State universities are most culpable.

A NEW METHOD OF OPERATING FOR TRICHIASIS, DISTICHIASIS AND ENTROPION OF UPPER LID.

Read in the Section of Ophthalmology at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY EUGENE SMITH, M.D.,

PROFESSOR OF OPHTHALMOLOGY AND OTOLOGY IN DETROIT COLLEGE OF MEDICINE, OPHTHALMIC SURGEON TO ST. MARY'S HOSPITAL, SURGEON IN CHARGE OF ST. MARY'S FREE EYE AND EAR INFIRMARY, DETROIT, MICH.

In common with many ophthalmic surgeons I have been for many years seeking for an operation for trichiasis or distichiasis which shall offer the easiest method to the surgeon and the best result to the patient.

The Jarsche-Arlt operation and the Graefe modification of it, has for many years been considered by some as the best method of correcting the deformity, notwithstanding the facts that inflammation occasionally destroys the good effect intended, and the operation is particularly difficult when the canthi are the seat of abnormal cilia. Modifications have been offered by many operators, but most of them produce more or less cicatricial deformity of the lids. Most of us know by experience that in the transplantation of the cilia upwards (Jarsche-Arlt), it is difficult and sometimes impossible to separate all of the hair follicles from the tarsal cartilage in dividing the lid into two layers, as some may be rooted immediately *on* the cartilage or even *in* its most superficial layers, and if papillæ remain on the posterior lip, the cilia will grow again and they may not make their exit through the old canal, but often perforate the new cicatricial tissue and again appear in a faulty position causing a renewel of the ocular trouble. No degree of carefulness in operating will enable one to guard against it.

The operation to which I wish to ask your attention is one I have been making for the past five years in my private and hospital practice, which is applicable to all cases and which has, so far, given perfect satisfaction to myself and my patients. I have made the operation more than fifty times for complete and partial trichiasis. Its chief recommendations are its efficiency and ease of performance. It is made as follows: A Snellen's clamp is placed on the lid and an incision is made with a Beer's knife along the free border between the faulty and the normal cilia, somewhat as in the Jarsche-Arlt operation. The incision is carried well up to the hair follicles, two or three lines, which are plainly seen when the slight flow of blood has been removed with a sponge or pledget of absorbent cotton. If the wound does not gape, it does usually, the anterior lip is lifted with forceps, and all the hair follicles upon the cartilage are delicately touched with the fine point of the galvano-cautery or the Pacquelin cautery. Where a group of faulty cilia are attached to the anterior lip their follicles are also touched with the cautery and thus destroyed. The wound is then washed with a $\frac{1}{5000}$ solution of sublimate lotion, a pledget of cotton dipped in the same lotion is placed on the closed lid and held in place with a strip of adhesive plaster, not being removed for 24 hours, at which time the faulty cilia either drop out or are easily removed. The wound is usually found closed and healed by first intention. The reaction is surprisingly slight. Only the *region of the hair follicles* is touched with the cautery, and care must be taken not to destroy or obliterate the canals of the tarsal glands, thereby causing atrophy and contraction of the cartilage and tarsal tumors, but with proper care a successful result follows the operation though it may be necessary to repeat it partially if in an occasional case all of the faulty follicles have not been destroyed in the first operation.

In cases of partial trichiasis, the incision in the margin of the lid should simply extend a little beyond either extremity of the space occupied by the inverted hairs. The operation can be easily carried into the canthi, and does not produce any cicatricial deformity.

In mild entropion with slight incurvation of the cartilage I have several times made a *grooving* of the cartilage with the galvano-cautery, somewhat after

the manner of the Streatfield operation, and in each instance with considerable success. I raise a flap of skin and muscle from the tarsal cartilage over the convex or clubbed portion and *groove* the cartilage by drawing the cautery along its entire length. I then return the flap to its place and hold it in situ with two or three points of suture. The operation is more simple than Streatfield's, as any one can see who has ever attempted to cut out a wedge shaped piece of the tarsal cartilage, *a la* Streatfield. If it is ever desirable to remove all of the eye-lashes to scalp the lid, as it were, it can be more easily accomplished with the actual cautery, and with less deformity or loss of tissue than by the old methods.

Discussion.

Dr. F. C. Hotz, Chicago:—I rise to refer to one remark the Doctor made, namely that all operations done for trichiasis leave disfiguring scars in the lids. I have tried, and as I believe succeeded, to improve the operation in trichiasis and one of my principal points has been to find an operation which will relieve the inversion of the eye lashes but also preventing disfiguring of the eye lid, a result which often followed these operations and especially the one to which reference has been made. The operation I have suggested has the advantage that cosmetically it leaves the lid in better condition than before, and the scar following the operation is put at such a place along the upper border of the lid that it is not perceptible, being hidden in the deep furrow caused by opening the lid. In my operation, we can therefore, not speak of any disfiguring scar.

As to the difficulty in dislodging all the eye lashes by splitting the lid and getting them all in the anterior flap, I must also disagree with the speaker. By making the incision far back, if necessary at the conjunctival line and by making it deep enough all the lashes can be dislodged. By splitting deeply and getting the wound to open up well by stitches and grafting in slender strip of skin, I think that you get as good results as you wish and reëstablish cosmetically the natural shape and form of the eye lid.

I do not quite understand the application of the cautery as spoken of by Dr. Smith. He spoke of treating the distorted and displaced eye lashes and leaving the normal eye lashes intact. That point I confess is not clear to me if he speaks of trichiasis. If we have the same conception of the condition spoken of as trichiasis, I think that there are no normally placed eye lashes because the border of the lid is so drawn down that all normally placed eye lashes are displaced. To destroy the abnormally placed lashes, it would be necessary to destroy them all; and in the case which has been exhibited, it looks to me as though all the eye lashes would come out.

Dr. G. C. Savage, Nashville, Tennessee:—For several years, I have done an operation for this condition. Part of the procedure is my own and I wish to briefly describe it and then you can judge whether or not it would be effective. At the first I commence by splitting the lid as Dr. Smith does then I took a double stitch which I shall describe later, so as to turn that portion of the lid out which contains the offending follicles. I found afterwards that the operation was better done by making Burow's incision. If the offending eye lashes exist throughout the lid, I make the incision from one end to the other. In addition to Burow's incision I make a cross incision at either end. These incisions involve the cartilage and everything to the skin. The stitch is all that I claim. The stitches are double. If I operate on the whole extent of the lid, after making the three incisions, I would take four stitches. I introduce the needle through the wound and bring it out in the skin just above the portion containing the hair follicles. I then pass over a portion of healthy skin and grasp another portion with the fixation forceps and transfix it with the needle. This is done from one extremity of the lid to the other before any knot is tied. The advantage which I claim is that, that portion of skin over which the thread is passed, by folding back will facilitate the turning out of that portion containing the hair follicles where the sutures are tied. The advantages are that we get wide gaping of the incision and elongation of the margins. The stitches are allowed to remain until the wedge shaped incision has had time to fill with plastic material. This is the easiest operation of any that I have performed for this condition. In my hands as well as in the hands of some others it has been very effective.

Dr. Eugene Smith, Detroit:—A word in regard to the remarks of Dr. Hotz. The operation of Dr. Hotz is apt to thicken the edge of the lid, which remains thickened and produces a certain degree of deformity which, however, is nothing in comparison with the irritation caused by the cilia. The Doctor speaks of inversion of the edge of the lid as trichiasis. I consider that entropion. I look upon trichiasis as that condition in which the edge of the lid is almost absolutely normal and we have the inverted eye lashes which spring from the normal border of the lid, the lashes being simply inverted. I also look upon other cases where the faulty lashes spring from the hair follicles and grow through the edge of the trichiasis and distichiasis. In a large majority of these cases, you can find a *space* between the inverted and normal cilia. My incision is made in this *space*. In the case shown the normal cilia were not touched with the cautery. Only the faulty follicles on the posterior lip were touched. The follicles on the anterior lip were not touched. When the dressing was removed this morning the faulty cilia came off with the dressing. Seldom do I have to remove them with cilia forceps. When this is necessary they come out without trouble. This case, gentleman, was operated upon but yesterday and in the presence of several members of this Section. The condition of the lid now, only 24 hours after the operation bespeaks more for the operation than can words of mine, as you see the case is well and no thickening or deformity exists.

BOOK REVIEWS.

THE CHINESE: THEIR PRESENT AND FUTURE; MEDICAL, POLITICAL, AND SOCIAL. By ROBERT COLTMAN, Jr., M.D., Surgeon in Charge of the Presbyterian Hospital and Dispensary at Teng Chow Fu; Consulting Physician of the American Southern Baptist Mission Society; Examiner in Surgery and Diseases of the Eye for the Shantung Medical Class; Consulting Physician to the English Baptist Missions, etc. Illustrated with Fifteen Photo-Engravings of persons, places, and objects characteristic of China. In one handsome Royal Octavo volume. 220 pages. Extra Cloth, price, $1.75, net. Philadelphia: The F. A. Davis Co., Publishers, 1231 Filbert Street.

This little volume is filled with information that is both instructive and entertaining.

SYPHILIS IN ANCIENT AND PRE-HISTORIC TIMES. By Dr. F. BURET, Paris, France. Translated by A. H. OHMANN-DUMESNIL, M.D. Philadelphia: F. A. Davis, Publisher.

This little volume is a veritable multum in parvo, embracing as it does a terse account of what has been said of this interesting subject by an almost interminable list of authors. The translator is one of the best known among American syphilographers and writers. The work is of intrinsic worth and should grace the shelves of every specialist and also of those who are interested in this field of study.

A TREATISE ON DISEASES OF THE LUNGS AND PLEURA. By the late Wilson Fox, M.D., F. R. S. Edited by SIDNEY COUPLAND, M.D., F. R. C. P. Philadelphia: P. Blakiston Son & Co., 1892.

This superb volume comprises the main literary work of one of England's best known physicians. While the subject matter is substantially the work of the distinguished author, its extent and much of its value is due to its editor.

The work is elaborate in setting forth in detail the sum of modern professional knowledge as it pertains to diseases affecting the lungs and their surrounding membrane, including diseases of the mediastinum.

DISEASES OF THE STOMACH. By DR. C. A. EWALD, Professor of Medicine in the University of Berlin. Translated from the second German edition, by MORIS MANGES, A.M., M.D., with thirty illustrations. New York: D. Appleton & Co., 1892.

This work is written in the form of clinical lectures, which are intended for the use of general practitioners, and are based upon stenographic reports of remarks at the *Ferien-curse für praktische Aerzte.*

Lectures I and II, gives the author's method of examina-

tion, to determine the acidity and acids of the contents of the stomach, the digestion of albumen and starch, power of absorption and motility and the technique of the examination. Lectures III and IV, pertain to the stenoses and strictures of the orifices and to dilatation of the stomach. Lecture V, to cancer, and lecture VI, to ulcer. Lecture VII to inflammations. While three lectures are devoted to the neuroses. In lecture XII the author illustrates the practical value of modern chemical tests.

BOOK ON THE PHYSICIAN HIMSELF, AND THINGS THAT CONCERN HIS REPUTATION AND SUCCESS. By D. W. CATHELL, M.D. New tenth Edition (Author's Last Revision). Thoroughly revised, enlarged, and rewritten. In one handsome Royal Octavo volume. 348 pages. Bound in Extra Cloth. Price, post-paid, $2.00, net. Philadelphia: The F. A. Davis Co., Publishers, 1231 Filbert Street.

This work by Dr. Cathell is one of the best known and popular books that has been offered to physicians during the past ten years.

NECROLOGY.

DR. BENJAMIN W. MCCREADY, Emeritus Professor of *Materia Medica* of Bellevue Hospital Medical College, died in New York City, on Wednesday the 10th inst. He was one of the senior graduates of old Barclay Street School, being of the class of 1835. He was over half a century in practice, leaving behind the record of a useful and honorable career. He was a good teacher, having filled a professorship of *Materia Medica* in the College of Pharmacy before 1860, at which time he united with Austin Flint, James R. Wood, Barker and others in founding the junior college at Bellevue. McCready was for many years a physician to Bellevue Hospital. During his prime there were few therapeutical chairs that drew better classes than his; he withdrew from the active duty of that chair in 1872 and was succeeded by Dr. William Hammond. He was a member of the Association in 1853, and about that time he was the editor of the *New York Journal of Pharmacy*. Dr. McCready retired from practice about seven years ago.

DR. A. R. BROWN HORNER, Surgeon and Medical Director U. S. Navy, died August 8, 1892, at Warrenton, Va., age 88. Dr. Horner had served sixty-five years and six months in the navy and at the time of death was the oldest medical officer, with the relative rank of commodore in the navy. He was three times appointed by the Executive, Surgeon-in-Chief of various squadrons, for many years was appointed on the Naval Medical Boards, by seniority became Surgeon General of the Navy, was the author of "Cruise in the Mediterranean" of "Medical Topography of Brazil and Uruguay" and of "Naval Practice," the latter one of the first publications of the kind in this country. He was honorary member of the Philadelphia Medical Society and corresponding member of the National Institute at Washington. In private, social and public life Dr. Horner lived up to the standard of a noble manhood. He neither used stimulants nor tobacco. During his long, eventful life he displayed an unswerving loyalty to the Federal Union and *mens sana in corpore sano*. He gave testimony to his faith in the Gospel of our Lord Jesus Christ as the ground of his hope of salvation hereafter.

THE AMERICAN MEDICAL ASSOCIATION.—The recent meeting at Detroit was probably one of the most important and best organized which the Association has ever held. Considerably over 1,000 medical men were present from all parts of the States, and not only the general meetings, where what may be called medical politics are for the most part discussed, but also the meetings of the various Sections, which occupied themselves with matters of purely professional or scientific interest, were conducted with a vigor and energy which showed how intent the members were on the various matters which had to be discussed. There were in all twelve Sections, each with a chairman and secretary of its own, and although occasionally a meeting of one or more Sections had to be adjourned out of consideration for the absorbing interest which surrounded a few of the general meetings, the amount of work which was accomplished was by no means small.

The meeting was opened in the Detroit Opera House. The stage was beautifully decorated with flowers and palms, and the house was filled with an audience which was evidently keenly interested in all the proceedings. After Bishop Davies had offered prayer and General Alger had in a few appropriate words welcomed the Association to Detroit the President of the year, Dr. Marcy, of Boston, delivered an address, the subject being "Evolution in Medicine." This somewhat technical title scarcely conveys an adequate idea of the scope and bearing of the interesting address which was delivered. It was indeed more a description of the development of the American Medical Association and an indication in outline of the direction in which it should proceed in the future, with the view of drawing closer together the various associations and societies throughout the country and of strengthening the hands of those who are endeavoring to press on reforms in regard to medical matters. One subject was referred to in the address in which the orator evidently carried with him his entire audience—viz., the proposed establishment of a national board of health presided over by a secretary of public health who should be *ex officio* a member of the Presidential Council. Such a board would take cognizance of all that affects the public health of the community, especially of epidemic and infectious diseases, and there seemed to be a universal consensus of opinion that such a central board would, in coöperation with the State boards of health, be the means not only of enforcing sanitary regulations but also of educating the people to recognize their importance and desirability.—*London Lancet*, Aug. 6.

THE following ordinance to prevent empiricism was recently enacted in the town of Effingham, in Illinois. Similar enactments in all village and town corporations would speedily locate all traveling charlatans. To locate such people, either drives them out of business or to the large cities.

AN ORDINANCE TO PREVENT EMPIRICISM.—Be it ordained by the City Council of the City of Effingham: That it shall be unlawful for any itinerant physician or itinerant vendor of drugs or medicines, to practice medicine in any of its branches, or sell or dispose of any drug, medicine, nostrum or ointment intended for the treatment of disease or injury, or to open an office for such purpose, or to announce to the public in any way an intention to practice medicine, or to sell or dispose of such drug, medicine, nostrum or ointment within the corporate limits of this city: Provided, That nothing in this ordinance shall be so construed as to prohibit any reputable physician or surgeon from any other place being called to see a particular case or family, or to do a particular operation in said city.

Any person violating this ordinance shall be subject to a penalty of not less than fifty ($50) dollars nor more than one hundred ($100) dollars.

Dated this second day of August, A. D. 1892.

Approved: J. B. WALKER, Mayor.

Attest: W. M. STEWART.

DILUTE HYDROBROMIC ACID (15-20 minims) is prescribed by Dr. B. W. Richardson with digitalis infusion (½ ounce) for noises in the head, with throbbing.

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All members of the Association should send their Annual Dues to the Treasurer, RICHARD J. DUNGLISON, M.D., Lock Box 1274, Philadelphia, Pa.

MEMBERSHIP IN THE AMERICAN MEDICAL ASSOCIATION.

This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own Society, signed by the President and Secretary of said Society, with five dollars for annual dues. Attendance as a delegate at an annual meeting of the Association is not necessary to obtain membership. On receipt of the above amount the weekly JOURNAL of the Association will be forwarded regularly.

SATURDAY, AUGUST 27, 1892.

MEDICAL SIDE OF CAPITAL PUNISHMENT.

The recent great advance in scientific knowledge of criminals and criminality, has given new interest to the question of capital punishment. Practically the subject has passed from the realm of morals, sentiment and law into that of science. The old time arguments pro and con, are childish when viewed from the side of modern science. The physician who is not familiar with the practical teachings of the modern views of crime has much to learn. The question of capital punishment to-day, is simply that of brain, health and soundness of the criminal. To take the life of a diseased and brain degenerate man is no punishment, and no deterrent of crime. The original object of capital punishment is defeated in such instances. The theory of revenge and retaliation in the punishment of crime, has no support in modern civilization, the question of responsibility is a medical one, beyond the theory and morals. The best authorities assert from careful physical study of criminals, that they as a class, have abnormal brains and brain structure; also marked degenerate types of organism. Deviation from the normal, and reversions backward to some lower stage of savagery. They also possess conditions of instability of brain force, and predispositions to diseases and morbid impulses, with feeble or absent moral powers, to recognise the higher consciousness of right and wrong. Criminals are not only defects externally, but are neurotics and irregular in their mentality, and suffer from many and complex disorders. The abnormalities of organism and structure, are followed by abnormalities of acts, with feeble power to return to a normal type.

A clinical study of criminals reveals a great variety of constitutional effections ,unnoticed before. Hereditary predispositions, palsies, traumatisms, brain malformations, and a constant tendency to recede from a healthy normal type. All forms and degrees of insanity, and brain weakness are constantly present. In view of these and many other general facts, it is literally impossible to determine the degree of health and capacity to act sanely and normally in the criminal. A committee of the New York State Medical Society has made a very able report on this subject recently. This report is purely scientific, and confined entirely to the question of the possible brain health and the capacity of the criminal to have done otherwise. The conclusions of this very elaborate report indicate that criminals have perversion of judgment and will for which there are many causes. These causes are either congenital or acquired. When congenital they develop progressively from disease or cerebral impairment, and when acquired arrive from injury, disease and external favoring causes. Cerebral anomalies and central brain lesions, are not accessible to ordinary investigation. Degrees of dementia and various obscure forms of insanity may exist for a long time unnoticed, and the moral or higher brain centers exhibit the only evidence of departure from health. Irrespective of all theory and opinion, these and other facts are so numerous and well attested, proving the disease and unsoundness of the criminal, that his punishment by death for any crime is of doubtful value from every scientific point of view. "The committee with knowledge of the physiological and psychological facts, and the absolute impossibility of making a positively safe diagnosis in every case of alleged crime or the presumable disease or anomaly of the criminal, expresses its opposition to the perpetuation of capital punishment, and its hope that means will be found to protect the community by less uncertain and more humane methods." This aptly expresses the latest voice of science. Appeals to the physical facts in the history of criminals, will give far safer standards to judge from, than theory or sentiment. Physicians should always be found on the scientific side of such questions. If the criminal is always sick and diseased, this fact will come to surface despite all theory and opposition. Physicians of all others should be students and teachers of public opinion in this. Capital punishment, whether barbaric or human, is a question of facts, that are within the domain of every medical man, and must be finally settled along this line.

IMPURE AMERICAN BROMIDES.

HELBING'S *Pharmacological Record* for May has an important statement concerning the undue proportions of potassium chlorate that are found in the bromides of American makers. An examination made by HELBING and PASSMORE show that it is a serious matter to buy the potash salt, at the present time, without having it carefully analyzed as to the percentage of chlorides it may contain. The English

drugs in their original packages, however, are pronounced as safe. Samples of those products did not yield higher than .13 per cent. of chlorate of potash, while four American samples carried from 4.52 to 5.96 per cent. The American Pharmacopœia permits of not more than three per cent., and the German about one per cent. The importance of purity in a drug of this nature is very great, and will receive the earnest heed of neurologists everywhere.

TREATMENT OF PNEUMONIA.

The treatment of pneumonia is ever a subject for consideration. In a recent clinical lecture, DR. ANDREW H. SMITH[1] has again given his views upon this subject. DR. SMITH'S ideas upon the employment of arterial relaxants in the treatment of pneumonia, have been given to the profession before, but do not seem to have attracted as much attention as they really deserve.

It is generally understood that in pneumonia, the local pulmonary lesion, and the constitutional manifestations are not necessarily in harmony. That is, that while an extensive local trouble may occur concurrently with severe general symptoms, yet the reverse may obtain, and great lung consolidation not be accompanied by serious general symptoms, or there may even be slight local trouble, with the most dangerous general condition.

Each of these two general factors is to be considered in determining the plan of treatment to be employed in a given case of pneumonia.

Extensive local trouble in the lungs reacts mechanically upon the heart, but as DR. SMITH has pointed out, it is the right heart which is involved, and not the left.

As the pulmonary circulation through the involved lung becomes more and more retarded, the right heart makes more strenuous efforts to overcome the obstacle, the tension in the pulmonary artery becomes higher, and the second pulmonary sound at the base of the heart becomes more accentuated. As the right heart flags in its work, the veins become overfull, and cyanosis makes its appearance. The left heart acting synchronously with the right, but without a great obstacle before it, adds to the difficulty by keeping the systemic veins over full. Under these circumstances it becomes necessary to relieve the right heart as much as possible. It is impossible to remove the obstruction in front of it, but much may be done to relieve the pressure of blood behind it. By relaxing the arteries, more blood is retained in them, and the venous pressure diminished. The agents employed for relaxing the arteries are principally the nitrites, and of these, amyl nitrite, and nitroglycerine act most rapidly, and sodium nitrite, the most persistently. Aconite and veratrum have the same power of relaxing the arterial tension, as does also the liquor ammoniæ acetatis. For the relief of the cyanosis, the inhalation of oxygen gas acts promptly, and it is hard to believe after seeing its action, that its good effects are confined to oxidizing the blood. When grave constitutional symptoms are present, the left heart is also in danger, and must be held up by stimulants. Of these alcohol and strychnia are probably the best, as they act without increasing the arterial tension. Digitalis should always be used with great caution, because it not only stimulates the heart directly, but also stimulates it through the contraction of the arterioles which it produces. Whenever used it should be guarded by the simultaneous use of an arterial relaxant, so that only its direct stimulation of the heart may appear. This is particularly true when the extent of lung tissue involved is great, and less so when the local lesion is slight. During the progress of the case, the condition of the left heart is watched at the pulse, while the condition of the right heart is determined by the character of the second pulmonary sound, by the cyanosis, and by the character of the respiration, in relation to the amount of lung consolidated.

[1] International Medical Magazine, July, 1892.

CHOLERA.

The epidemic of Asiatic cholera in Russia continues its ravages in that country. More than 6,000 new cases have been reported almost every day for more than a month, with a mortality rate of nearly or more than half that number. Estimates based on official statistics indicate that more than 35,000 deaths from cholera have occurred in Russia during the present summer. The epidemic of choleriform diarrhœa in Paris has nearly disappeared. The disease was mainly in the suburbs, and almost wholly among the rag-pickers and those who were living under very bad hygienic conditions. The total number of deaths reported is about 400. The prevention of the further spread of the disease is due to the strict measures adopted by the government authorities.

In Berlin and other German cities and towns the most stringent sanitary measures have been adopted to prevent the disease obtaining a foothold in that country. The police authorities have issued notices which prohibit the importation into or passage through the lines of travel of all old clothes, bed or other linen, rags, etc., fruit, fresh vegetables, butter and cheese from Russia. The clothes and luggage of travelers are to be disinfected.

The German Government Department for medical matters has addressed circulars asking for the names of physicians, especially of those in posts, hospitals and universities, who are competent and ready to carry out bacteriological examinations in connection

with cases of supposed cholera, and who are willing to assist the government medical officers in case cholera should break out and become epidemic.

We are pleased to notice that our own government through its Consular Officers is kept well informed of the progress of cholera in European and Asiatic countries and is alive to the necessities of a strict quarantine against all infectious material.

As we go to press the cable informs us of the spread of cholera to Havre. This important European seaport is in almost constant touch with this country through common commercial and other interests, and it will be a high tribute to the value of sanitary science if our quarantine officers are equal to the occasion and show the possibility of affording protection to our people. The lateness of the season is favorable, but it should not be forgotten that previous epidemics of this disease have made their first appearance in October and as late as December.

EDITORIAL NOTES.

NOTE.—The paper by Prof. H. J. Herrick, M.D., on the Relative Interdependence of Organs of the Body in Health and Disease, published on page 221 of our last issue was read before the Section on Medicine, and not by title as indicated in the heading. The author's initials are H. J., instead of J. B.

PREVENTION OF PUERPERAL SEPSIS, on page 205 of the issue of Aug. 13, should have been credited to the editorial department of the *Buffalo Med. Journal*.

OUR AUGUST VACATION TIME.—The editor of the *Maryland Medical Journal*, in considering the advisability of his taking a summer's outing, falls into a monologue like the Prince of Denmark, and murmurs: "To skip or not skip, that is the question. Whether 'tis better in town to suffer the heat and swelter of the month of August, or to take grip in hand and migrate to some mountain clime, or to some pebbled beach? To dive, to swim, to loaf, but in that loaf, what images of science come forth—the clustered rods of typhobacillus, lurking in myriads in the hotel well, borne on the seepage of some neighboring cesspool; the organisms that thrive in dysentery; the germs of common everyday sepsis, each form more toxic than the other. Coiled on the mountain lurks the dreaded rattler, with lethal hypodermic ready; or at the seaside, in those hired bathing garments hide the germs of grave infections—of eczema, chancroid and secondary—ready to fasten on the fretted skin."

These apparitions of uncertain ills puzzle the will, and make him rather bear the city trials he has known, than fly to country ones which mayhap are worse: Thus science doth make coward of the editor, and he grows sicklied o'er with the pale cast of doubt and excessive transpiration from the heat. The newly developed, almost virgin fields of North Carolina should be good for his complaint.

ILLINOIS STATE BOARD OF HEALTH.

ABSTRACT FROM THE MINUTES OF THE MEETING OF JULY 27, 1892.

1.—Colleges requiring four (4) or more years of study and four (4) or more terms of lectures as conditions of graduation:

Chicago Medical College, Medical School, Northwestern University, Chicago, Ill.
Harvard University Medical School, Boston, Mass.
Boston University School of Medicine, Boston, Mass.
Department of Medicine and Surgery, University of Michigan, Ann Arbor, Mich.
Homeopathic Medical College, University of Michigan, Ann Arbor, Mich.
Leonard Medical School, Raleigh, N. C.
McGill University, Faculty of Medicine, Montreal, Que.[1]
University of Toronto, Faculty of Medicine, Toronto, Ont.
Ecole de Medicine et de Chirurgie, Montreal, Que.
Trinity Medical College, Toronto, Ont.
Laval University, Medical Departments, Quebec and Montreal, Que.
Royal College of Physicians and Surgeons, Kingston, Ont.
Halifax Medical College, Halifax, N. S.
Dalhousie University, Faculty of Medicine, Halifax, N. S.
University of Bishop's College, Faculty of Medicine, Montreal, Que.
Medical Department of Western University, London, Ont.
Woman's Medical College, Toronto, Ont.
Women's Medical College, Kingston, Ont.
Manitoba Medical College, Winnipeg, Man.

2.—Colleges requiring four (4) or more years of study and three (3) terms of lectures as conditions of graduation:

California Medical College, San Francisco, Cal.
College of Medicine, University of Southern California, Los Angeles, Cal.
Rush Medical College, Chicago, Ill.
Hahnemann Medical College and Hospital, Chicago, Ill.
Bennett College of Eclectic Medicine and Surgery, Chicago, Ill.
Woman's Medical College, Chicago, Ill.
Chicago Homeopathic Medical College, Chicago, Ill.
College of Physicians and Surgeons, Chicago, Ill.
Medical College of Indiana, Indianapolis, Ind.
Central College of Physicians and Surgeons, Indianapolis, Ind.
Medical Department, State University of Iowa, Iowa City, Ia.
College of Physicians and Surgeons, Keokuk, Ia.
Iowa Eclectic Medical College, Des Moines, Ia.
Hospital College of Medicine, Louisville, Ky.
College of Medicine and Surgery, of the University of Minnesota, Minneapolis, Minn.
Homeopathic Medical College of Missouri, St. Louis, Mo.
American Medical College, St. Louis, Mo.
University Medical College, Kansas City, Mo.
Eclectic Medical College of the City of New York, New York, N. Y.
Medical College of Ohio, Cincinnati, O.
Eclectic Medical Institute, Cincinnati, O
Cincinnati College of Medicine and Surgery, Cincinnati, O
Miami Medical College, Cincinnati, O.
Women's Medical College, Cincinnati, O.
Medical Department Willamette University, Portland, Or.
University of the State of Oregon, Medical Department, Portland, Or.
Dartmouth Medical College, Hanover, N H.

Colleges requiring three (3) or more years of study and three (3) terms of lectures as conditions of graduation:

Cooper Medical College, San Francisco, Cal.
Medical Department, University of California, San Francisco, Cal.
Hahnemann Hospital College, San Francisco, Cal.
University of Denver, Medical Department, Denver, Col.
Medical Department. University of Colorado, Boulder, Col.
Gross Medical College, Denver, Col.
Yale University, Department of Medicine, New Haven, Conn.
National Medical College, Washington, D. C.
University of Georgetown, Medical Department, Washington, D. C.
Howard University, Medical Department, Washington, D. C.
Medical Department, National University, Washington, D. C.
Fort Wayne College of Medicine, Fort Wayne, Ind.
Iowa College of Physicians and Surgeons, Des Moines, Ia
Homeopathic Medical Department, State University of Iowa, Iowa City, Ia.
Medical School of Maine at Bowdoin, Brunswick, Me
University of Maryland, School of Medicine, Baltimore, Md.

[1] Canadian diplomas are subject to the resolutions of the State Board of Health of March 21, 1891.

College of Physicians and Surgeons, Baltimore, Md.
Baltimore Medical College, Baltimore, Md.
Women's Medical College, Baltimore, Md.
Detroit College of Medicine, Detroit, Mich.
Minneapolis College of Physicians and Surgeons, Minneapolis, Minn.
College of Homeopathic Medicine and Surgery, Minneapolis, Minn.
Missouri Medical College, St. Louis, Mo.
St. Louis Medical College, St. Louis, Mo.
Medical Department, University of Missouri, Columbia, Mo.
Kansas City Medical College, Kansas City, Mo.
St. Louis Hygienic College of Physicians and Surgeons, St. Louis, Mo.
Omaha Medical College, Omaha, Neb.
Medical Department, Cotner University, Lincoln, Neb.
College of Physicians and Surgeons in the City of New York, New York, N. Y.
Albany Medical College, Albany, N. Y.
University of the City of New York, Medical Department, New York, N. Y.
Medical Department of the University of Buffalo, Buffalo, N. Y.
Long Island College Hospital, Brooklyn, N. Y.
New York Homeopathic Medical College in New York City, New York, N. Y.
Bellevue Hospital Medical College, New York, N. Y.
New York Medical College and Hospital for Women, New York, N. Y.
Women's Medical College of the New York Infirmary, New York, N. Y.
College of Medicine of Syracuse University, Syracuse, N. Y.
Medical Department Niagara University, Buffalo, N. Y.
Western Reserve University, Medical Department, Cleveland, O.
Starling Medical College, Columbus, O.
Homeopathic Hospital Medical College, Cleveland, O.
Medical Department, University of Wooster, Cleveland, O.
Pulte Medical College, Cincinnati, O.
University of Pennsylvania, Department of Medicine, Philadelphia, Pa.
Jefferson Medical College, Philadelphia, Pa.
Hahnemann Medical College and Hospital, Philadelphia, Pa.
Women's Medical College of Pennsylvania, Philadelphia, Pa.
Medico-Chirurgical College, Philadelphia, Pa.
Western Pennsylvania Medical College, Pittsburgh, Pa.
Medical College of the State of South Carolina, Charleston, S. C.
Meharry Medical Department, Central Tennessee College, Nashville, Tenn.
Medical Department, University of Vermont, Burlington, Vt.

The following is a partial list of medical colleges the diplomas of which are required to be supplemented by examination:

Medical College of Alabama, Mobile, Ala. [2]
Medical Department Arkansas Industrial University, Little Rock, Ark. [3]
Medical College of Georgia, Augusta, Ga. [2]
Atlanta Medical College, Atlanta, Ga. [2 3]
Woman's Medical College of Georgia and Training School for Nurses, Atlanta, Ga. (First session 1889–1890.)
Southern Medical College, Atlanta, Ga. [2]
Physio-Medical College, Chicago, Ill. (First session 1891–92.)
Eclectic College of Physicians and Surgeons, Indianapolis, Ind. (First session 1890–91.)
Keokuk Medical College, Keokuk, Iowa. (First session 1890–91.)
Kansas Medical College, Topeka, Kan. (First session 1889–90.)
University of Louisville, Medical Department, Louisville, Ky. [3]
Kentucky School of Medicine, Louisville, Ky. [3]
Louisville Medical College, Louisville, Ky. [3]
Medical Department, Tulane University of Louisiana, New Orleans, La. [2 3]
Medical Department, New Orleans University, New Orleans, La. (First Session 1889–90.)
Baltimore University School of Medicine, Baltimore, Md. [3]
College of Physicians and Surgeons, Boston, Mass. [3]
Michigan College of Medicine and Surgery, Detroit, Mich. (First session 1888–89.)
St. Louis College of Physicians and Surgeons, St. Louis, Mo. [3]
Northwestern Medical College, St. Joseph, Mo. [3]
Ensworth Medical College, St. Joseph, Mo. [3]
Beaumont Hospital Medical College, St. Louis, Mo. [3]
Marion-Sims College of Medicine, St. Louis, Mo. [3] (First session 1890–91.)
Kansas City Homeopathic Medical College, Kansas City, Mo. (First session 1888–89.)
Northwestern Ohio Medical College, Toledo, O. [3]
Cleveland Medical College, Cleveland, O. (First session 1890–91.)
Medical Department, University of Nashville and Vanderbilt, Nashville, Tenn. [2 3]
Medical Department, University of Tennessee, Nashville, Tenn. [3]
Memphis Hospital Medical College, Memphis, Tenn. [2 3]
Chattanooga Medical College, Chattanooga, Tenn. (First session 1889–90.)
Tennessee Medical College, Knoxville, Tenn. [2 3] (First session 1890–91.)
Hannibal Medical College, Memphis, Tenn. [3] (First session 1889–90.)
Texas Medical College and Hospital, Galveston, Texas. [2] (First session 1888–89.)
Medical College of Virginia, Richmond, Va. [3]
University of Virginia, Medical Department, Charlottesville, Va. [2]

There are in addition to the foregoing a number of other institutions whose requirements as to periods of study and attendance upon lectures, facilities for practical anatomy and for hospital and clinical instruction are so inadequate as to preclude their graduates from any standing before the Board, and there are some half-dozen or more others which are under investigation by the Board.

REPORT OF THE COMMITTEE OF THE STATE BOARD OF HEALTH OF ILLINOIS ON MEDICAL EDUCATION AND MEDICAL COLLEGES.

OFFICES OF THE BOARD,
Springfield, Ill., July 27, 1892.

To the President:

SIR:—Your committee, appointed to report on the practical workings and results of the resolution of the Board, adopted July 8, 1887—by which it was required that colleges, to be held in good standing for the purposes of the Illinois Medical Practice Act should, after the sessions of 1890–91, require four years of professional study, including any time spent with a preceptor, and three regular terms of lectures, as conditions of graduation, and should otherwise conform to the schedule of minimum requirements theretofore required by the Board, begs leave to submit the following:

In the last report on medical education and medical colleges, 1891, by Dr. John H. Rauch, to the Illinois State Board of Health, there is given, on pages 170–2, a list of medical colleges in the United States and Canada then in operation. The total is 148, but of this number 4 do not grant degrees, 3 have suspended, and 4 are not recognized by the Board.

An analysis of the remaining 137 colleges given in Dr. Rauch's list, and which embraces, substantially, all the established medical institutions in this country, is here submitted.

There are 19 colleges which require four (4) or more years of study and four (4) or more terms of lectures as conditions of graduation; there are 27 which require four (4) or more years of study and three (3) or more terms of lectures as conditions of graduation; there are 55 which require three (3) or more years of study and three (3) terms of lectures as conditions of graduation; there are 16 which require only three (3) years of study and only two (2) terms of lectures as conditions of graduation; and 5 are silent as to number of years of study, and graduate on only two (2) terms of lectures.[4]

This showing, it is submitted, is a most encouraging one. Over one-third of the established medical institutions of

[2] Requires no entrance examination.
[3] Graduates on two terms of lectures.
[4] This accounts for 122 of the 137. Of the remaining 15, 12 are thrown out of the analysis because, being of less than five years' existence, they cannot be said to have established a standing. They comprise four 4-year and 3-term schools; four 3-year and 3-term schools; three 3-year and 2-term schools; and one 2-term school. It will be seen, therefore, that including them would not affect the proportions as obtained in the 122 established medical colleges.
Two 4-year and 3-term colleges and one 3-year and 3-term college are also thrown out, because under investigation by the Board as to their standing.

the country now exact four (4) or more years of professional study and three (3) or more terms of lectures as conditions of graduation; 45 per cent. more require three (3) or more years of professional study and three (3) regular terms of lectures.

That is to say, nearly eighty-three (83) per cent. have complied, substantially, with the resolution of the Illinois State Board of Health of July, 1887.

Of the remaining 17 per cent. all but two are Southern schools—the exceptions being the College of Physicians and Surgeons of Boston, Mass., and the Northwestern Medical College of Toledo, O.

In view of these results of the operation of the July, 1887, resolution, as shown by this analysis, it is hereby recommended that, in the discharge of the responsibility with which the Board is vested by the General Assembly—to determine the good standing of legally chartered medical institutions, the diplomas of which may be presented to the Board as the warrant for the State certificate which is "conclusive as to the right of the lawful holder of the same to practice medicine in this State"—the following rules be adopted:

RULE 1.—Any established, legally chartered medical institution shall be held to be in good standing, for the purposes of the Illinois Medical Practice Act, which conforms to the course and period of study, the number, character and length of lecture terms, the duration of attendance on hospital and clinical instruction, and the other requirements of a medical education which obtain as the practice of a majority of the established medical colleges of the United States and Canada.

RULE 2.—No medical college can be held to be in good standing until it has established its claim to such standing by an active existence of not less than five (5) years, and then only upon compliance, during such period, with the terms of Rule 1, and by its work and the character of its graduates as determined by the examination of the Board.

RULE 3.—Graduates of medical colleges which do not fully conform to the practice of the majority of established medical institutions in good standing may, in the discretion of the Board, obtain State certificates upon passing examinations in writing in the branches of the usual medical college course, to wit: anatomy, physiology, chemistry, materia medica and therapeutics, theory and practice of medicine, pathology, surgery, obstetrics and gynecology, hygiene and medical jurisprudence.

Graduates of medical schools of less than five (5) years' existence, but which conform to the practice of the majority of established medical institutions in good standing, may, in like manner and in the discretion of the Board, obtain State certificates upon passing examinations in the branches of the usual medical college course as above recited.

No fee shall be charged for the examinations provided for by this rule.

RULE 4.—Any medical institution which is not recognized by the American Medical College Association, or by the American Institute of Homœopathy, or by the National Eclectic Medical Association, or by the American Association of Physio-Medical Physicians and Surgeons, as the case may be, shall be declared and held to be not in good standing for the purposes of the Illinois Medical Practice Act.

Your committee would add that it believes the necessity and propriety of the above rules are so obvious that no argument is needed for their adoption.

Concerning Rule 3, however, it may be observed that its effect would be to avoid individual hardship in the case, for example, of a graduate of a college which had not yet established its good standing by the necessary period of active existence, or in the case of a graduate of an established college which had failed to conform fully to the requirements of the Board. Instead of punishing the individual graduate for the immaturity or the laches of his alma mater, he would be entitled to a State certificate on demonstrating his fitness to be entrusted with the "interests of the life and health of the citizens of the State" as a practitioner of medicine.

And this, it is conceived, is the primary and essential object of the Illinois Medical Practice Act.

All of which is respectfully submitted.

B. M. GRIFFITH.
R. LUDLAM.
A. L. CLARK.
W. R. MACKENZIE.
D. H. WILLIAMS.

SELECTIONS.

HEROES AND MARTYRS.—We deeply regret to have to announce the death of Dr. Tilden from typhoid fever, contracted, it is believed, from bacillary infection, arising in the course of a research which he was conducting on the bacillus of typhoid. Dr. Tilden was intending to bring some of the results of his pathological studies before the meeting of the British Medical Association now in progress at Nottingham. It will be remembered that Dr. Mahomed similarly fell a victim to his scientific and self-sacrificing ardor. Such incidents in the history of the devoted laborers in medical research have been only too sadly common of late. Three students of St. Thomas' have suffered the dangers which the modern heroes of the physiological and pathological laboratory have to face. One—Mr. Lucas—died from infection in studying puerperal septicæmia; another becoming infected with local tuberculosis, was saved by amputation of the finger, but not without serious constitutional njury. Dr. Spear, one of the ablest of the inspectors of the Local Government Board, died not long since from constitutional infection with anthrax, of which he was making a careful prophylactic study; and another inspector, Dr. Monckton Copeman, only the other day came nigh to a catastrophe from a similar cause. The silent heroism of the medical scientist who pursues knowledge amid much surrounding peril is often passed unnoticed, but is none the less worthy of honor and respect.—*Brit. Med. Journal.*

THE PRESENT ATTITUDE OF THE MEDICAL PROFESSION IN REGARD TO THE SURGICAL MANAGEMENT OF SPINAL INJURIES.—This question of the surgical treatment of those lesions of the medullary substance and the osseous structure of the spine, is one of enormous importance, and should be definitely settled by those whose practice, study and observation properly qualify them to speak.

Watson, at the Nashville meeting of the American Medical Association, presented an exhaustive and analytical monograph which has gone a great way to define the relation between physical traumatic lesions and subsequent pathological changes, as revealed through an extensive series of injuries inflicted on etherized dogs.

Manley, of New York, followed him with a series of thirty cases of serious spinal lesions of every degree of severity, reported and described before the New York Medical Association; besides, in another full and systematical monograph the following year, at the Washington meeting of the American Medical Association. The latter fully and unequivocally endorses the conclusion of Watson from his observations on the living subject, and concludes that Erichsen's "railway spine" is a purely mythical entity.

Let the contesting brethren test their mettle in this controversional warfare; but what we want is the "searchlight thrown on." The simple question is: In serious spinal injuries, which cause paralysis and lead to the suspicion of fracture or displacement, do modern surgical methods permit us to safely make an exploratory incision? In other words, make a simple, a compound fracture; remove the fragments if there are any, or expose the cord.

The profession is ominously silent on this question. In this immense country there must be many broken backs in the course of the year. But, we hear nothing from them except now and again when an odd one has been successfully treated by surgical intervention. What becomes of the rest?

Are the failures relegated to quiet oblivion, or are operators reluctant to increase their mortuary records?—*Times and Register.*

POISONING BY ICHTHYOL.—The increasing employment of ichthyol in the treatment of various conditions such as sprains, lymphatic enlargements, and certain diseases of the skin, renders a full acquaintance with its powers as a medicinal and toxic agent necessary on the part of the general practitioner and specialist. It is probable that there are few drugs which, applied externally, can exert so favorable and rapid an effect as ichthyol. Many physicians, who have never employed it, can scarcely be made to believe the rapid changes which take place in diseased tissues under its free and proper employment.

We have already pointed out elsewhere the singularly good results which follow its inunction about joints which are inflamed by gout and subacute rheumatism. In association with salicylates, there is certainly no application which gives as great relief to the patient as does ichthyol. That the drug is capable of producing poisonous symptoms seems to be proved by the report of an Italian physician, Dr. Bergerio, who has employed the drug as an intrauterine injection after curetting the uterus. Shortly after the injection the patient complained of a fishy taste in the mouth and of the odor of ichthyol. The pulse became exceedingly rapid, and symptoms of collapse came on with great rapidity. These symptoms, however, disappeared in about twelve hours. Naturally, Bergerio concluded that this case of intoxication was due to the absorption of the drug from the exposed surface of the uterus, and he reports that his colleague, Peroni, observed, in another case, vomiting, headache, convulsions, and diarrhœa after the employment of ichthyol in a patient who was suffering from prurigo.—*Therapeutic Gazette.*

ADULTERATED IODOFORM GAUZE.—According to the *Chemist and Druggist* for June 11, 1892, one of the German analytical laboratories has detected an adulterated iodoform gauze, which was labelled "iodoform gauze, thirty per cent." It contained eight per cent. of iodoform, and the color had been heightened by a nitrated derivative of phenol.

To detect this adulteration, the gauze should be plunged in water, when the water becomes of a yellow color. Pure iodoform gauze does not yield its color to water.

TREATMENT OF BLENORRHAGIA WITH PERMANGANATE OF POTASH. Prof. Reverdin (*Gaz. Hebdom. Scien. Med.*).—A solution is made of 1 to 5000—two grains to the pint—and, by means of a small catheter passed down to the bulb, the urethra is thoroughly irrigated with about a quart of it. This may be done with a syringe, but better by an elastic tube attached to a little cistern suspended above the patient's head. To avoid staining his linen, which may lead to disastrous revelations, the patient stands up and passes the penis through a hole in a waterproof apron tied round his waist. The injection should be used at the temperature of 100° F., and twice a day. No medicine is given, and a cure should be effected in from three days to a fortnight, generally in a week.

MISCELLANY.

THE MEDICAL SOCIETY OF VIRGINIA, will convene for the 23d annual session at Alleghany Springs, Montgomery Co., Va., September 13, 1892.

On Wednesday morning, September 14, at 10 o'clock, the Society will be called to order. Business of a general character will be in order until 11 o'clock, when the President, Dr. H. Gray Latham, of Lynchburg, will deliver the annual address of the President.

Papers will be:

Appendicitis, by Dr. Wm. Edward McGuire, Richmond, Va.

Laparotomy and the Good Accomplished by it in Gynecology, by Dr. R. S. Martin, Stuart, Va.

Some New Ideas that are Old, by Dr. S. W. Dickinson, Marion, Va.

Necessity of Prompt Action in Cases of Placenta Prævia, With Report of Cases, by Dr. L. H. Keller, Luray, Va.

Some Ocular Diseases in Children, by Dr. Phillip Taylor, Richmond, Va.

Mysteries of Medicine, by Dr. C. W. Gleaves, Wytheville, Va.

Injuries of the Knee; Their Treatment and Results, with Special Reference to the Prevention and Cure of Suppurative Action in and About the Joint, by Dr. M. W. O'Brien, Alexandria, Va.

In response to the postal issued during August, 1892, the following have responded:

The Causative Relations of Bacteria to Disease, by Dr. C. M. Blackford, Lynchburg, Va.

Common Sense in the Treatment of Discharge from the Ear, by Dr. Alexander Duane, No. 25 E. 31st St., New York, N. Y.

Some Uses of the Iodides, by Dr. L. G. Pedigo, Roanoke, Va.

Cataract, Dr. Joseph A. White, Richmond, Va.

Some Remarks on the Continued Administration of Digitalis, Illustrated by the Report of a Case, by Dr. F. M. Brooks, Fairfax Station, Va.

Also in response to invitations duly issued, the following invited guests have promised papers:

Uterine Hæmorrhage and Present Method of Treatment, by Dr. A Vander Veer, Albany, N. Y.

Surgical Management of Fibroid Tumors of the Uterus, by Dr. Joseph Price, Philadelphia, Pa.

Modern Electrical Methods as a Substitute for Surgery in Certain Pelvic Affections, by Dr. G. Betton Massey, Philadelphia, Pa.

Sexual Hypochondriasis and Perversions of the Genesic Instinct, by Dr. Irving C. Rosse, Washington, D. C.

What Shall Be Done With the Imbecile, by Dr. Samuel J. Fort, Ellicott City, Md.

Hypnotism as a Therapeutic Agent, by Dr. Wm. Lee Howard, Baltimore, Md.

THE TWENTIETH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION will be held at the City of Mexico, Mexico, November 29, 30, and December 1 and 2, 1892. The Mexican Government has interested itself in the work, thereby assuring the success of the meeting. All the details are in the hands of Federal officers of the Republic of Mexico. The General Government has requested every State to send delegates. Invitations have also been extended to Central and South America. The session will continue four days, and owing to the expected large number of papers the Association will probably, for the first time, do its work in Sections. Prominent sanitarians and scientists from the United States, Canada, Mexico, and the Central and South American Republics will take an active part in the meeting.

THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS will hold its fifth annual meeting at the Lindell Hotel, St. Louis, Tuesday, Wednesday and Thursday, September 20, 21 and 22, 1892. The President, Dr. A. Vander Veer, of Albany, N. Y., wishes it understood that all members of the medical profession interested in the subjects discussed, or who are friends of the Association, even though not especially interested in its branch of work, are most cordially invited to attend the several sessions.

The Lindell Hotel will be the headquarters of the Association during the meeting, and has a convention hall which will provide ample accommodation for its sessions.

By order of the Executive Council.

WILLIAM WARREN POTTER, Sec'y.

OFFICIAL LIST OF CHANGES in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from August 13, 1892, to August 19, 1892.

Capt. Adrian S. Polhemus, Asst. Surgeon U. S. A., is granted leave of absence for one month, to take effect about September 1, 1892.

Capt. Marcus E. Taylor, Asst. Surgeon U. S. A., leave of absence granted on surgeon's certificate of disability is extended four months on surgeon's certificate of disability.

OFFICIAL LIST OF CHANGES in the Medical Corps of the U. S. Navy, for the Week Ending August 20, 1892.

P. A. Surgeon Richard Ashbridge, detached from Navy Yard, New York, and wait orders.